the
UNIVERSITY
of
TORONTO
MEDICAL
JOURNAL

MAR. 1965 VOL. XLII NUMBER 5

SEX

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THE NATURE OF THE FEMALE ORGASM

With the preceding background let us begin the discussion of the female orgasm by using as a standard of comparison the physiological and anatomical attributes of the male orgasm. In the male there is an orgastic spinal centre in the sacral segment of the spinal cord. Discharge of semen or ejaculation can arise two ways. First through simple mechanical stimulation of the glans penis. This is purely a spinal mechanism. The second mode of ejaculation occurrs at a higher level. This is brought about by psychological stimuli on the higher cortical centres. Hence such things as erotic literature, dreams (with nocturnal emissions), even anticipation of sexual contact may cause an orgasm without the primary mechanical stimulation of the glans penis. In normal sexual relationships the orgastic response of the male is governed by a combination of both neurological factors, namely spinal and cortical. Ejaculation is the final result of continued mechanical stimulation and psychic excitement. Reflex centres in the spinal chord begin to emit rhythmical impulses (sympathetic) which leave the chord via L-1 and L-2. They pass to the genital organs via the hypogastric plexus. Ejaculation begins with peristaltic contractions in the testis, epididymis, and the vas deferens to cause expulsion of sperm into the internal urethra. At the same time the seminal vesicles and the prostate contract along with muscles at the base of the erectile tissue to expel the seminal and prostatic fluid.

The above description describes a purely physiological sequence of events; it is common knowledge however, that psychological distractions in the male, whether they be of a minor or major nature, can cause sexual inadequacy. This inadequacy can take the form essentially different from orgasm obtained through clitoral stimulation. Are the orgasms experienced in these two ways distinct in nature and quality? Other writers on this topic acknowledge the experience of two kinds of orgasm. One of a relatively mild intensity, and the other of a more intense and deeper nature. Without delving into the morass of controversy on the subject, the other main school of thought regarding the differences between the two types of responses is basically the following: the female of the human species is anatomically and psysiologically equipped to experience intense orgastic sensations. The quality of these sensations may vary however according to the patient's psychic milieu. This psychic state depends upon the factors governing the atmosphere of the particular situation, the sexual background of the female and the sum total of her cultural inhibitions. Without discussing the dynamics of frigidity, let us use this sexual upset to illustrate the mechanisms involved in the orgastic reaction. If a strong, deep-seated psychological deterrent exists, whether through guilt, anxiety, hostility, or sexual ambivalence, the orgastic mechanism will be totally inhibited, or neurologically speaking the influence of cortical centres will be so great as to inhibit even the spinal reflex mechanism from the clitoris through to the orgastic centre in the spinal cord. If some psychological inhibition exists, but not to an overwhelming degree, then the mechanical stimulation of the act of intercourse on the clitoris and vagina will initiate orgasm at a lower spinal level. These somewhat inhibited women experience orgasm of a clitoral type (ie. lesser intensity)—but they experience some form of orgasm none the less. This type of lesser response can be present in normal healthy women with no psychological problems. Interviews with patients have revealed that "it all depends on the situation". In some instances, sexual intercourse is looked upon as a frolicking game, filled with frivolity and slap-stick abandon. The situation calls forth a less intense response. On other occasions the sexual act is viewed by the same couple as a solemn and sacred love ritual. Then the emotional stimulus is greatly heightened, there is enhanced cortical excitement, both clitoris and the interior of the vagina are mechanically stimulated, and the woman abandons herself to the convulsive, shuttering intensity of an enriched orgasm. The female will then have experienced what has been called the *vaginal* orgasm.

Previously this concept of the vaginal orgasm carried with it the implicit assumption that the physical stimulation was due to vaginal intercourse, and the vaginal wall and mucosa were being excited. However, the clitoris is also stimulated and remains an important factor in initiating the orgastric response. Hence, the difference between the so-called clitoral and vaginal orgasms are explicable not in terms of the different origin or location of the orgastric response but in terms of different intensity and the degree to which cortical factors are contributory. As in the male, the inhibition (impotence) or intensity varies with the degree of psychological stimulation present. And again as in the male, the female orgasm may be possible without any genital stimulation whatsoever. (ie. clitoris or vagina). Orgasm may be elicited in some females by nipple suction, kissing, by genital manipulation of the male, or even in dreams, or such abstract situations as having a shampoo and scalp rub by a male hair-dresser. One may safely say therefore, that the actual spinal mechanism is identical in all females and variations in the orgastic response are due to the degree of psychic facilitation or inhibition.

FRIGIDITY: FUNCTIONAL DISTURBANCE IN SEXUAL LIFE OF THE FEMALE

Like all topics of controversy, frigidity goes by many definitions. In this article when frigidity is spoken of, the term will mean a neurotic condition manifested through a psychosomatic sexual illness. Thus this term does not refer to any single condition, but rather a wide variety of phenomena ranging from severe phobic abhorence of the act of intercourse with vaginismus, to cases where the sexual act may be pleasureable in varying degrees, but without orgasm. As stated before

Bergler in accordance with Freudian psychology defines frigidity even more rigidly . . . "the sole criteria of frigidity is the absence of *vaginal* (most intense) orgasm". Although essentially both definitions say the same thing, this paper will adhere to the latter one for purposes of classification.

The classification of frigidity by Hitschmann and Bergler is as follows:

a) *Organic frigidity:*

This is a relatively small group of conditions which on the basis of tissue pathology limit or destroy the capacity for sexual contact and enjoyment. (i.e. a systemic illness, destructive process such as a neoplasm, an acute infection of the Bartholin glands, or prolapsed uterus). Thus initially the female in question should undergo a complete physical and gynecological examination to rule out any organic disease.

b) *Psuedo-Frigidity:*

Again the orgasm does not occur, but its lack is not caused by any inherent impairment either physically or psychologically on the part of the woman. The absence is due to ignorance of sexual technique, false sexual theories, and male impotence (failure to sustain an erection or premature ejaculation). This state can be corrected by simple retraining of the couple concerned.

c) *Facultative Frigidity:*

In this instance, orgasm may occur, but only with certain men. For example a wife who obtains no sexual gratification from her husband, may with other men be able to sustain an intense orgastic response during an illicit affair.

d) *True Frigidity:*

This group comprises virtually all of the problems of so-called frigidity. Bergler distinguishes a number of sub-groups:

1. Total frigidity with vaginal anaesthesia:

This is the severest form of the condition. Sexual intercourse is entirely without interest. There is no hint of clitoral or vaginal pleasure. The act is looked upon with revulsion and disgust, simply as a submission to the male partner. The female wishes to get it finished as soon as possible. There is no foreplay, and if there is, no sensations arise from the erotic zones. Usually there is a lack of normal lubricating glandular secretion from the vagina, and artificial lubricants are used. There is absent-mindedness during the act, and total lack of participation. This condition carried to its most pathological extreme, results in vaginismus. To the unhappy bewilderment of the male partner, the female musculature of the vagina and the pelvic floor go into spasm—even to the point of preventing penetration. If there is penetration, it is always associated with intense discomfort and pain (dyspareunia) or there may be immediate nausea, vomiting or fainting. The woman may cry out pleading with her husband to stop. This is a serious psychiatric situation and may be looked upon as a conversion hysteria problem. Often this condition arises from early childhood trauma of a severe and distressful nature (i.e. penetration of the vaginal canal in youngsters by foreign objects have been found in the history of more than one-third of the cases).

2. Total frigidity with vaginal hypoesthesia:

The patient experiences slight excitement at the begining of coitus. This excitement remains at the same level throughout the act. There are traces of glandular secretion, with slight sensitivity of the clitoris. There are no involuntary muscular contractions.

3. Relative frigidity with vaginal hypoesthesia:

The patient is responsive in this condition, may experience definite excitement at the thought and expectation of coitus, but once in bed is fearful and unable to react. At a high level the patient experiences true vaginal sensitivity, but there is sudden cessation of excitement just before the onset of the orgasm. Finally patients may be stimulated via the clitoris by the mechanical contact of intercourse and experience a less intense type of response. No vaginal orgasm is experienced however. In many cases the coital movement does not make sufficient contact with the clitoris of the vagina. The female's personality inhibits her from assuming the female dominant position, which renders her most susceptible to clitoral orgasm and not allow her husband to help her attain relief from her sexual tension by manual manipulation of her clitoris. This may have resulted from a strong parental reaction to self-masturbation. In some cases dreams may liberate the trapped orgastic response.

4. Nymphomania:

Pity the man who finds himself in the clutches of a nymph! The age old dream of every post-pubertal youth and frustrated medical student would soon become a nightmare. The 'nymph' is an insatiable woman who is never fulfilled, and who never reaches orgasm. She frantically exhausts all male comers, taunting them, urging them to fill the void which is not sexual at all, but spiritual and psychological. Usually the male is unaware of this creature's psychopathology, and his inability to satisfy her, particularly if he is a novice leads to feelings of his own inadequacy . . . and eventual impotence.

6. Sexual Perversion—Lesbianism:

In this situation the female is incapable of obtaining an orgasm with a male partner. But with a female full orgastic response is possible.

INCIDENCE

Opinion varies as to the incidence of frigidity. Some sources state that one woman out of every three obtains vaginal orgasm (the most intense response) while three out of four get clitoral satisfaction. Other figures are higher. Knight states that 75% of all married women de-

rive little or no pleasure from the sexual act. Williams divides the married female population into three approximately equal groups. The first whose adjustment is near perfect do experience vaginal orgasm. Those who occasionally welcome sexual contact rarely obtain orgasm in normal coitus. Finally there are those who never have normal coitus, and whose feelings are always of disgust and revulsion. Although statistics are highly inadequate and inaccurate in this field, one fact is quite obvious, namely that the gravity of the problem and its prevelance among married women raise it to epidemic proportions. When one considers the tremendous importance placed upon sex in our society, then the problem of frigidity with all its ramifications becomes more than an academic exercise. Every physician should be alerted to its presence for it may present in subterranean and devious ways. The corroding effect that this neurotic illness may play on a marriage, will result in marital discord, infidelity, and divorce.

Etiology and Psychodynamics

a) *Psychological Factors*

To understand this problem more clearly it is necessray to review briefly the psychology of female psychosexual development. It is here, in the unique evolution of the female personality, that the seeds of sexual destruction are sown. This process is enacted in every growing female child. The way the child learns to respond to universally common female predicaments, will result in her orientation to the world, and her personal expression of femininity . . . especially her future attitude toward sex.

At the beginning of this article the point was made that sexual behaviour, is a mode of conduct which is selected from values of a particular society. Society will also erect strict guide-posts for correct feminine, conduct. A certain *female image* will be created by society and reinforced, augmented, or changed according to the particular religious, economic, and family situation. Certain general principles overt in American or European society can be enunciated. First, for the female there is an increase in restrictions, warnings and moral discipline. The male is a much freer and independent individual. Second both in pre and extra-marital experiences the female is forced to accept the 'double standard', and is subject to great social disgrace and condemnation should she break with this convention. Thirdly, her major social function remains maternal, and her individuality is submerged in this all-encompassing role. Finally she is subjected to more physiological upheavals, increasing the chance for greater psychological instability. (i.e. puberty, menstruation, loss of virginity, pregnancy, trauma of child-birth, lactation, and finally menopause). All these factors must be recognized and overcome as the female makes her way in the world. It can be seen that society demands a subordinate role for the woman. She is already in conflict!

b) *Personal Factors*

Again, there is no one theory which completely encompasses this complex subject. Freud's theory is that the essence of female libidinous development stems from the anatomical differences in genitalia. The little girl's discovery of the absence of a penis, is looked upon by her as abnormal. To her this lack is viewed as a punitive deprivation by her parents and results in the female castration complex. She clings to the fantasy that she will grow one later. As the female child grows she is subject to the Oedipal conflict, and antagonistic feelings develop such as love and hate towards parents and other siblings. Depending upon the pathology inherent in the family situation, the female child may learn distorted sexual theories, and develop neurotic attitudes and attachments. The woman's substitute for the penis becomes the clitoris, complete with all the erotic sensations evoked during self-masturbation. As was mentioned before, Freud believed that the fixation of the libido on the clitoris, in early childhood, give rise to a more primitive and less intense form of orgasm in married life. Modern schools of psychiatry however disagree with the primary emphasis Freud placed on the comparative anatomical differences between male and female. They believe that the female genitalia are themselves the primary factor in female psychology. The first biological fact discovered by the female child is that the vaginal cavity is a hollow recepticle. The denial or lack of discovery of it is said to result from fears of large objects which might be introduced. These fears although they take the form of fantasy, are substantiated in real life situations. (i.e. coitus in animals, observations of vaginal bleeding from menstruation and partuition). Again as mentioned above, the most easily discovered part of the female anatomy is the penile analogue, the clitoris. In time, if more and more attention becomes focused on it the path of development which leads to normal pleasureable vaginal activity and sensitivity is short-circuited by the double mechanism of the denial of the vaginal cavity and affirmation of the clitoris.

Knight states that the above state of affairs leads to further suppression of awareness of the presence of a vaginal cavity, and paves the way for traumatic comparisons with the penis, and anxieties about presumed past damage or feared future damage to her already inadequate genitalia. In connection with such distorted theories and anxieties, her relationships to other individuals also become distorted. Her first emotional attachment, like that of the boy is to her mother. However, unlike the male child, her first attachment is homosexual, not heterosexual. The girls libidinal orientation must shift from her mother to the males in the family, namely brothers or father, and then finally to males outside the original blood group. Because of any number of reasons the female child may not make this transition, and remained over-attached (fixated) to the mother. This feeling may also be augmented by feeli

of envy, fear, or even hate of boys and men. In later life she remains attached to other females (not necessarily overt homosexuality). Or the transition from female attachment may be partially accomplished, and the woman may enter into a marriage relationship for reasons of procreation. However, persistent childhood anxieties may remain with her, resulting in conflicts regarding sexual activity. These repressed fears combine with more active threats such as fears of defloration, pregnancy and child-birth to reinforce the notion that coitus is a damaging assault on the women by a cruel man. Frigidity, in one of its many forms is the result. Normal healthy women also go through the same historic development. However, their family situation allowed for relatively anxiety-free transference of emotional bias from the mother to the father, and then to males outside the family group. Any fears which they may have, have been sufficiently repressed so that they cannot be elicited by normal questioning or observation of outward behaviour. Only their disguised derivatives, the unconscious fantasies and hidden anxieties brought forth in dreams betray their presence.

Classification of Mental Mechanisms Underlying Sexual Maladjustment

There are many ways to classify the mechanisms involved in the production of frigidity. Rado and Bergler serve as interesting comparisons in terms of their approach to the same problem.

Rado's classification is based upon the flight-fight-partial adjustment theory of human behaviour.

A *Flight From Heterosexuality*

(all in this group are presumptively frigid)

1. Withdrawal into chastity, failure to attract men, avoidence of suitors and narcissitic self-sufficiency.

2. Masculine identification: old-maidism, competition with men, espousal of causes involving women's rights.

3. Homosexuality: women engaged in lesbian practices—revulsion to all men.

B *Combat: Aggressive Battling with Heterosexual Objects* (group actually frigid)

1. Marriage with female dominance; constant berating and down-grading of husband.

2. Finanical exploitation.

3. Prostitution: degradation and infection of men, with only pecuniary interests in sex.

4. Nymphomania: aggressive pursuing of men with seduction, a constant quest for sexual fulfillment which is never obtained.

C *Partial Adjustment* (fairly good outward appearance, sex becomes sublimated in favour of other aims.)

1. Marriage characterized by resignation, suffering, and martyrdom.

2. Household obsession with cleaning, decorating, etc.

3. Inhibition and prudishness; sexual pleasure is sinful.

4. Glorification of motherhood; numerous children conceived with indifference.

5. Aggressive pursuit of a career.

6. Refusal to assume any obligations; card-playing travelling, etc.

The above group is relatively frigid, and sexually responsive only on rare occasions.

Bergler's classification deals more with Freudian psychodynamics, and he postulates three main categories.

1. *Physical causes*

   a) Systemic: i.e. advanced T.B., cancer, heart disease with shortness of breath, kidney disease with uremia, malnutrition, chronic fatigue due to anemia, chronic alcholism etc.

   b) Local: usually presents through the symptom of dyspareunia. i.e. unyielding hymen, urethritis, cervicitis, P.I.D., congenital abnormalities, displacement of organs.

2. *Concomitant of Other Mental Conditions*

Frigidity is only one of the aspects of the total morbid psychiatric picture. This symptom may be part of the hysterical personality, with conversion hysteria phenomenon. It may represent an anxiety neurosis, endogenous depression, or it may be an early sign of serious mental illness. i.e. G.P.I. or other organic psychoses; schizophrenia.

3. *Psychogenic Disturbances*

Bergler lists as many as fifteen psychodynamic types. Only several will be mentioned here and briefly discussed.

a) Oedipus Fixation
This is a hysterical conversion reaction, based on the remnants of oedipus and castration complexes. This state is unconscious since the original love for the father has been repressed. Hysterical women are without exception frigid. They are unconsciously trying to keep a balance between the wish for a father as a love object, and the desire for punishment, because of the guilt which is felt for the prohibited wish. These women may be found in severe cases looking after their father and leading not unhappy lives. But married life is ambivalent and tragic. The female may also be fixated on her mother, and the disorder becomes the frigidity of latent homosexuality.

b) Oedipus Complex plus Castration Complex (revenge)
Two outstanding tendencies:
1. to seek revenge against men
2. to acquire a penis by force.

Sex Chromosome Abnormalities and Human Infertility

J. E. Fagen 6T5

INTRODUCTION

The normal human being is a diploid organism possessing two sex chromosomes and twenty-two homologous pairs of autosomes, one of each pair being maternal in origin, the other paternal. Light microscopy studies of suitably stained cell preparations in interphase show that each chromosome consists of two identical arms (called chromatids) above, and two arms below a lightly staining linking structure called the centromere. This centromere is thought to be of critical importance in chromosomal distribution during cell division.

The only type of division that somatic cells undergo is mitosis. At this time the centromere becomes adherent to a spindle fibre and then divides longitudinally, resulting in equal distribution of genetic material to both daughter cells.

Meiosis, the other form of cell division, occurs only in germ cell reproduction. Here two cell divisions occur. In the first, the homologous chromosomes pair, their centromeres attach to a spindle fibre, and polar migration then occurs without division of the centromere. Hence each daughter cell receives half the original pair, i.e. a total of twenty-two autosomes and one sex chromosome, the haploid number. The second meiotic division is mitotic in form, division of the centromere yielding haploid daughter cells, but with a single chromatid arm on either side of the centromere.

In this process of chromosomal movement errors occasionally occur which result in unequal chromosome distribution to daughter cells. In mitosis the fault might be with either the spindle fibre or centromere. In meiosis there are other possibilities such as lack of pairing with random movement of the two chromosomes involved, or a defect in the separation of the pair once it has joined so that one daughter cell receives one more chromosome than normal, the other one less (non-disjunction). It is also possible for one of the chromosomes to lag behind while the daughter cells are separating (anaphase lag), and be incorporated in the wrong cell or be lost.

The effect of any abnormality of chromosome distribution is a particular genetic imbalance, the nature of which depends on the particular chromosome that is extra or missing. Cells with this abnormal complement are called *aneuploid*. If the cell is capable of survival and cell division it will continue to replicate its kind. Should aneuploidy exist in the fertilized ovum (zygote) virtually all the cells of the organism will be of the same genetic constitution. If the aneuploidy occurs in the first cell division of the zygote or later, the organism will exhibit what is known as a *mosaic* chromosome pattern in which there are two different chromosome complements in the cell population. The effects on the developing embryo will depend on the proportion of cells which are aneuploid and to which organ systems they contribute.

The effect of the absence of a chromosome (monosomy) is generally more deleterious than that of a chromosome in triplicate (trisomy). No autosomal monosomy has yet been discovered although sex chromosome monosomy is the abnormality seen in Turner's Syndrome. Three autosomal trisomy syndromes have been established: Down's Syndrome (Mongolism), the D-1 Trisomy Syndrome, and the 18 Trisomy Syndrome.[2] In each there is a characteristic pattern of developmental anomalies.

In addition to whole trisomy it is possible to have only a part of a chromosome in triplicate, partial trisomy. This can occur from chromosomal breakage and rearrangement with resultant deletion or insertion of a broken piece or pieces. The phenotypic expression of such a partial trisomy is thought to be directly proportional to the size of the chromosome fragment present. The larger the fragment the more closely the phenotype resembles that of whole trisomy. The cause of these chromosome breakage anomalies is unknown, although they may be produced experimentally by radiation.

The study of chromosome behaviour has progressed rapidly during the past four years. During this period more than thirty different types of chromosome abnormality associated with congenital disease have been observed. This is due largely to the development of improved cytological techniques. It is now possible to study the chromosomes of cells obtained from the buccal mucosa, as well as those of dividing leukocytes in short term culture of small samples of peripheral blood. This permits the recognition of chromosomal abnormalities under the oil immersion lens of the standard microscope. However, only gross aberrations can be appreciated with the light microscope. Small chromosomal deletions or duplications are as yet not recognized using present day cytological techniques. In the vast majority of genetic diseases, presumably due to specific gene mutation, the chromosome defect is far beyond the resolving power of the light microscope and is thought to occur at the molecular level.

Those patients having autosomal aneuploidy show severe mental and skeletal defects which usually prevent reproduction if they do not cause death before puberty. Yet such an individual is potentially fertile, having normal gonads and genitalia. Patients with sex chromosome abnormalities do not necessarily suffer such severe skeletal and mental maldevelopment. However, transmission of the disorder is prevented by infertility caused by a specific failure to produce mature germ cells. Such a patient could thus present for diagnosis and treatment at an infertility clinic.

The discovery of the sex chromatin body by Barr and his associates in 1949 has made possible the recognition of the chromosomal sex of any individual from his somatic cells. The existence of a sex chromatin body indicates the presence of two X chromosomes in that nucleus. In aneuploidy involving more than two X's the number of sex chromatin bodies is one less than the number of X chromosomes present.[1]

The non-mosaic types of sex chromosome abnormality discussed in this paper are thought to be due to unequal chromosome partitioning during gametogenesis. Figure 1 illustrates how this likely occurs.

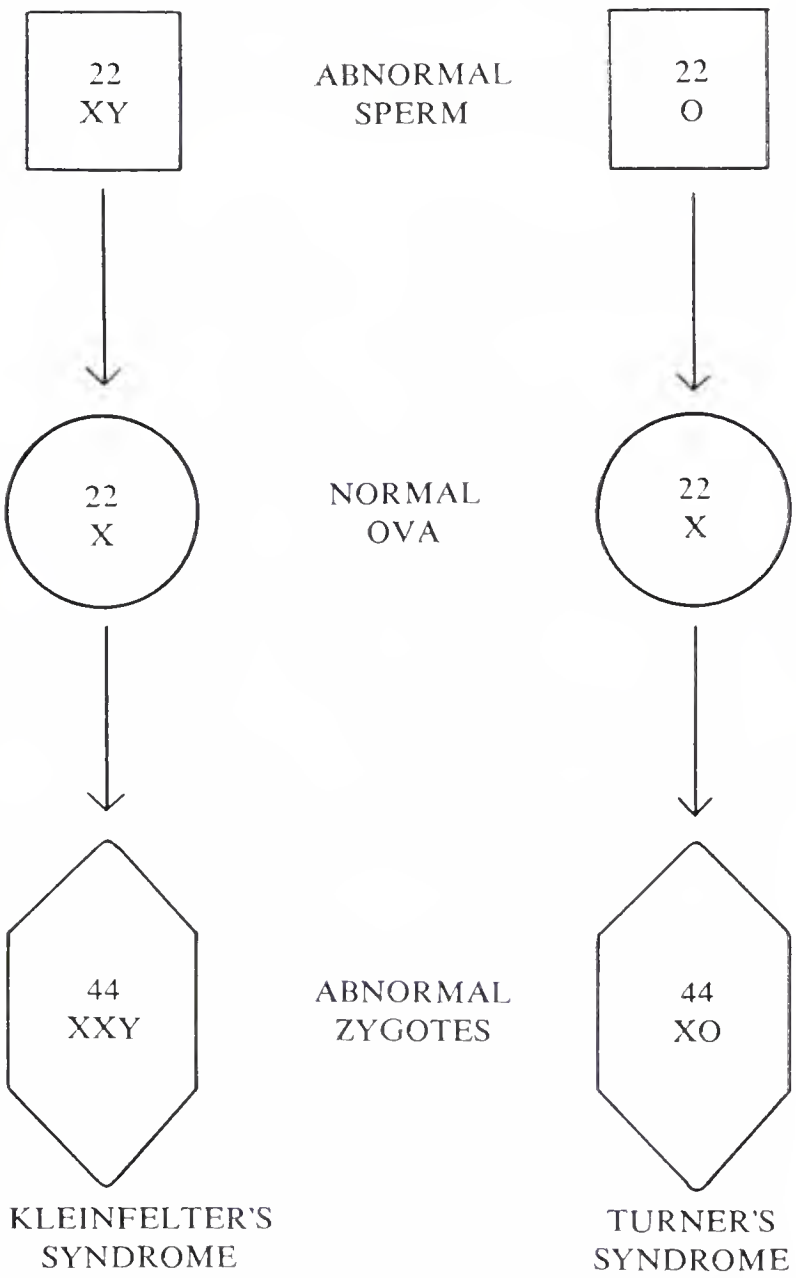

Figure 1. (a) Sperm abnormal, Ovum normal.

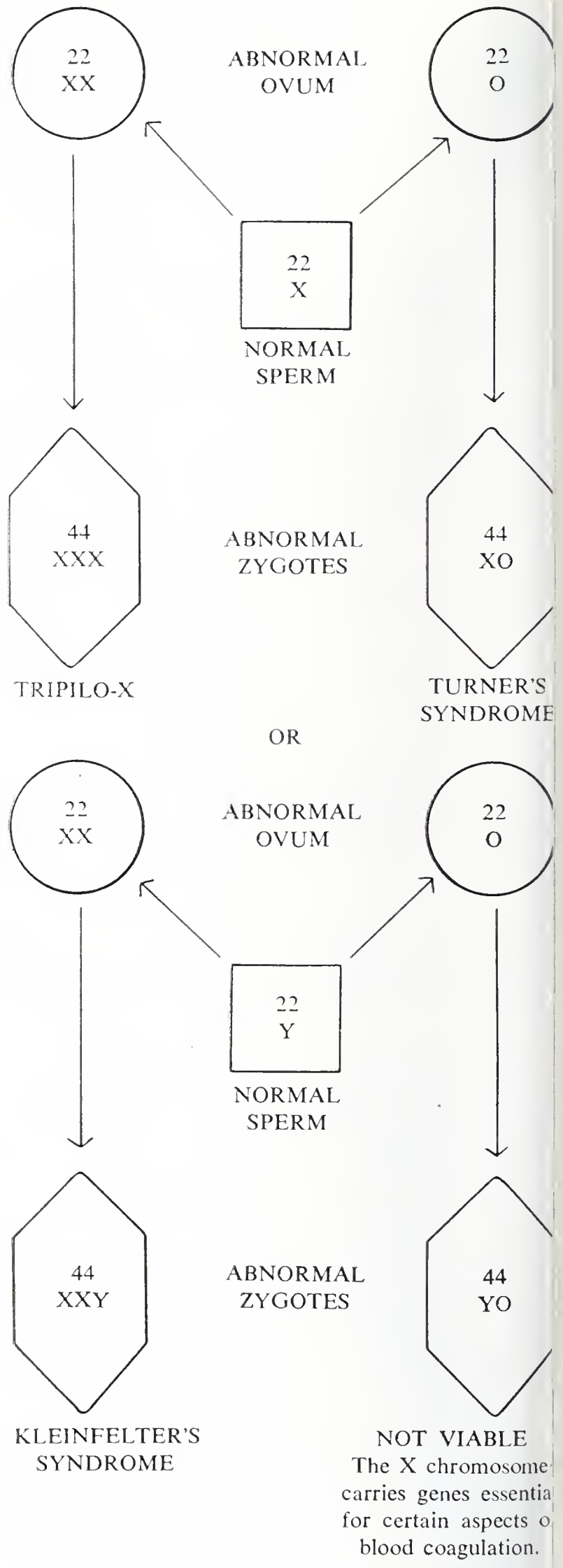

Figure 1. (b) Ovum abnormal, Sperm normal.

The chromosome mosaics arise after fertilization from normal and abnormal zygotes.

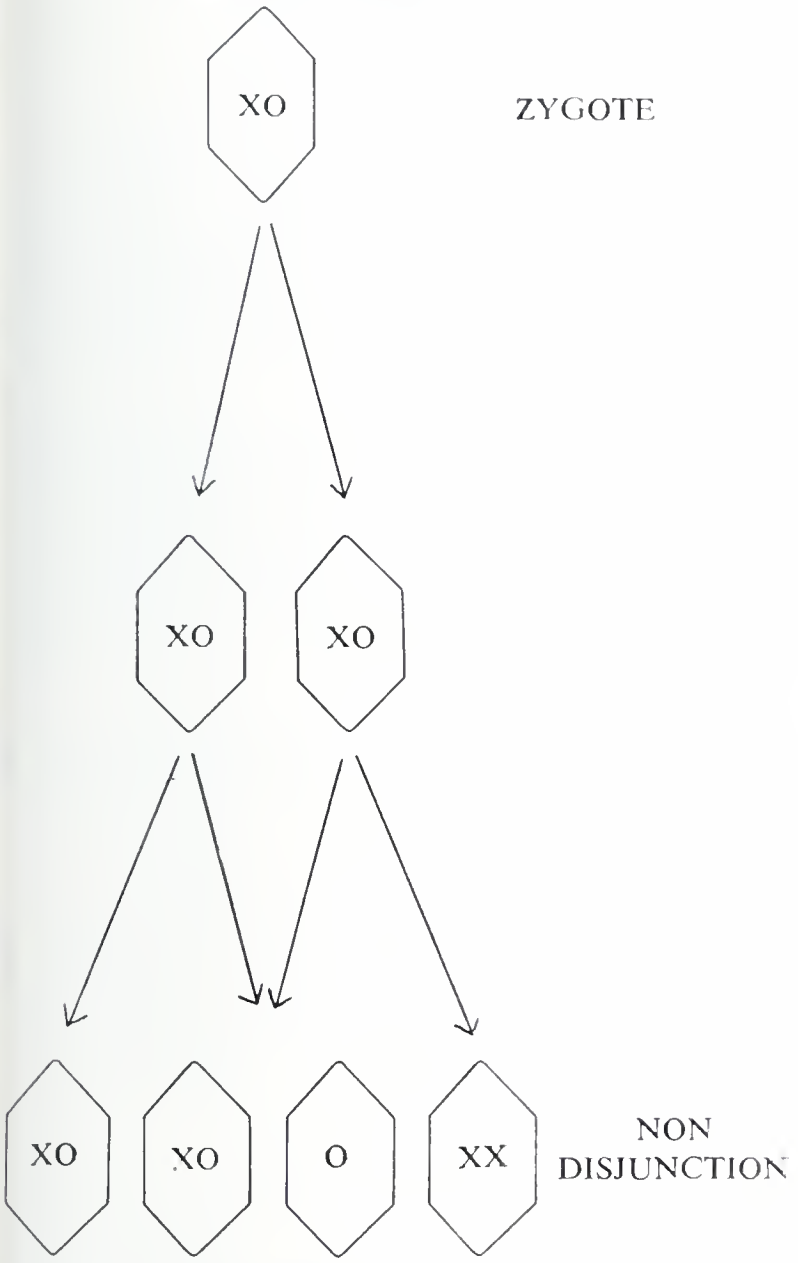

Figure 2. Possible origin of an XO/XX chromosome mosaic from an XO zygote.

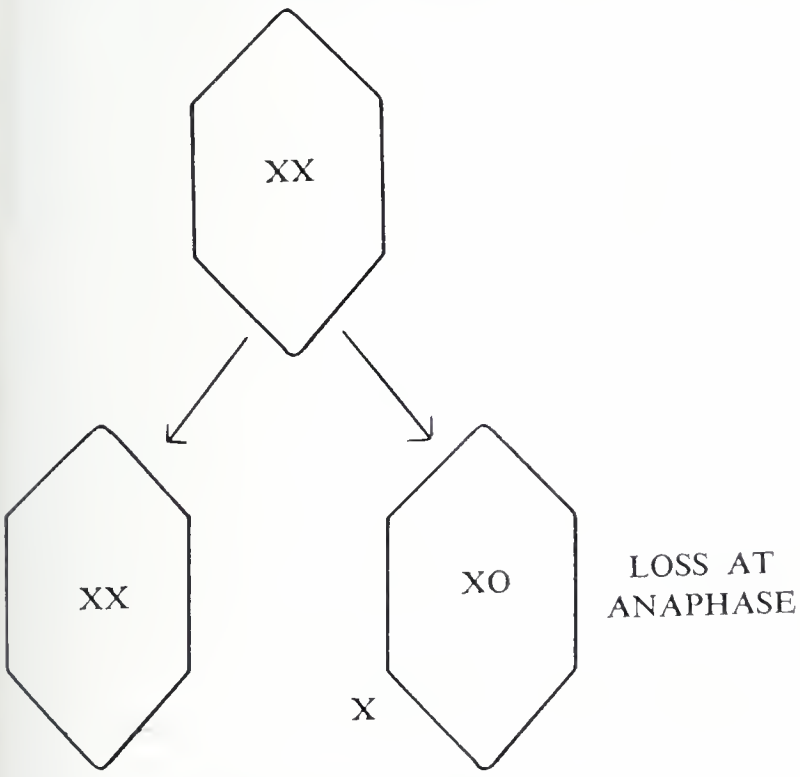

Figure 3. Possible origin of an XO/XX chromosome mosaic from an XX zygote.

Let us now consider the manifestations of these abnormalities.

SEX CHROMOSOME ABERRATIONS IN THE PHENOTYPIC FEMALE

1. Primary Ovarian Dysplasia (Turner's Syndrome)

Clinically, the individual has a female pheneotype with essentially normal external genitalia, vagina, uterus, and tubes. The principal defect is in the gonad, which is represented by slender streaks of connective tissue simulating ovarian stroma attached to the broad ligament. Derivatives of the mesonephric duct may be present, but there is rarely any evidence of ovarian follicles or seminiferous tubules. In the typical syndrome various congenital abnormalities are associated with gonadal dysgenesis. Shortness of stature is almost always present and there are often cutaneous folds at the side of the neck (webbing). Less frequently there may be a variety of skeletal or vascular abnormalities such as congenital lymphoedema or coarctation of the aorta. Urinary excretion of pituitary gondotrophins is elevated after age ten and secondary sexual characteristics fail to develop at puberty. The triad of short stature, primary amenorrhea and absence of pubic and axillary hair is almost pathognomonic so that the diagnosis is rarely missed, even in the absence of other congenital abnormalities.

Chromosome findings in chromatin NEGATIVE Ovarian Dysplasia with and without webbing of the neck:

A large proportion of cases of gonadal dysgenesis have chromatin negative nuclear sex. These cases have been shown to have 45 chromosomes, with only one sex chromosome, an X. This gives a sex formula symbolically designated XO. It is interesting to observe that these females have the same high incidenece of red-green sex linked recessive colour blindness as males with their single X, and not the low incidence found in normal females with their two X chromosomes.

Chromosome findings in chromatin POSITIVE women with Ovarian Dysplasia:

Chromosome anomalies have been reported so far only in women with chromatin positive gonadal dysgenesis *without webbing* of the neck. The chromosome findings fall into two major groups, the mosaic group and the isochromosome group. However, a small number of patients do not fit into either.

(A) Mosaic Group

This is a small group of patients whose tissues appear to be made of two or more populations of cells with different chromosome numbers. The commonest situation encountered so far is a mixture of cells, some possessing 45 chromosomes and XO, the remainder with 46 chromosomes and XX (XO/XX). Two cases have been described with a combination of XO and XXX

cells found side by side. One patient has been described in whom cells with 45, 46, and 47 chromosomes apparently coexisted. Her sex formula was XO/XX/XXX.

The fact that webbing of the neck is absent in all members of this mosaic group of phenotypic females with gonadal dysgenesis is significant. The implication is that the expression of genes in cells with a single X chromosome has been altered by the action of normal alleles on the other X chromosome in cells with two X's. Also, it is theoretically possible that the mosaicism may result in the formation of all or parts of a gonad or gonads with a normal chromosome complement. Such gonads or their parts should develop and function normally in the manner determined by their XX or XY sex chromosome complement.

(B) Isochromosome Group

This group of chromatin positive women with gonadal dysgenesis has the normal chromosome number of 46. On analysis it appears that their cells contain a single X chromosome and trisomy of the third autosome. Because they are chromatin positive the presence of two X chromosomes is inferred. It is believed that one of the three chromosomes resembling autosome three is in fact a modified X chromosome, called an isochromosome. This is thought to have been the result of misdivision of the centromere, perpendicular rather than parallel to the long axis of the chromosome during gametogenesis. The expression of this structural abnormality of the X chromosome is similar to that seen its absence, namely gonadal dysgenesis.

Other structural anomalies have also been found, which, coupled with the nuclear sex finding, suggest the existence of deletions of a greater or lesser part of an X chromosome in a number of women with ovarian agenesis. These patients are being thoroughly investigated as they appear in an effort to localize within the chromosome the zones of genetic control of sexual and somatic function.

Incidence

Chromosomal abnormalities are very frequently found in women with primary amenorrhea. It is currently felt that between one third and one half or more of such patients may have such an anomaly. The overall incidence of sex chromosome aberration in phenotypic females has been estimated to be in the order of one in five thousand women.

2. Tripilo-X Females

With the recognition and understanding of the XO and XXY sex chromosome abnormalities came the prediction that XXX females would be found. To date, a small number of such patients have been described. They are chromatin positive with a chromosome number of 47 and an XXX sex formula. Many of the nuclei seen in preparation of their buccal mucosal cells show *two* sex chromatin masses, a fact suggesting their sex chromosome constitution.

Clinically, the majority of these women are intellectually retarded. There is no other demonstrable somatic or sexual abnormality. A few show secondary amenorrhea but many have given birth to normal children of both sexes, with normal sex chromosome complements. This is contrary to the expectation that one half of the offspring should be XXY (Kleinfelter's Syndrome) and half XXX. This raises the possibility that these women may be mosaics with ovaries endowed with normal single X ova.

The XXX condition is thought to arise from unequal chromosome distribution during gametogenesis. It is note worthy that the maternal age at the birth of 85% of such females is 35 or more. This is comparable to the average age of 36.7 years for unselected mothers of children with Down's Syndrome (Mongolism). The control value is 28.5 years.[3]

In addition, a small number of cases have been reported with double sex chromatin and fragmentation of the third X.

3. Women with Four X Chromosomes

At least two such women have been described. They showed severe mental retardation, but were otherwise unremarkable. As expected the nuclei of their buccal mucosal cells contain three sex chromatin masses.

4. Testicular Feminization

This condition is also characterized by primary amenorrhea and sexual alopecia. Breast development after puberty is generally normal, the external genitalia are feminine, but the vagina is usually short and ends blindly. The uterus is always absent and intraabdominal or inguinal testicles are found. This condition is inherited in a sex linked manner. These patients are chromatin negative on nuclear sexing. Their chromosome number is 46 with a normal male XY complement. The condition is explained by an inherited mutation, with failure of the testes to accomplish their usual endocrine function.[4]

SEX CHROMOSOME ABERRATIONS IN THE PHENOTYPIC MALE

1. Primary Micro-Orchidism (Seminiferous Tubule Dysgenesis, Kleinfelter's Syndrome)

This disorder comprises a heterogenous group of sex chromosome anomalies, each type having at least one Y chromosome and two or more X chromosomes, in addition to the normal autosomal complement.

Clinically, the only constant feature is testicular atrophy. Other features, such as gynecomastia, eunichoid habitus, anomalies of hair distribution, and a lowering of intelligence, are variable. (Future surveys

may discover cases with normal gonads, for in mosaicism it is theoretically possible for a phenotypic male sex chromosome mosaic to have normal testicular function.)

Histologically the seminiferous tubules are highly abnormal. They are commonly represented by hyaline masses, or by small tubules with a thickened lamina propria which contain Sertoli cells or epithelial-like cells which are difficult to identify.[5] However, the structure of the testicle is almost always normal before puberty. It appears that the male determining factors carried by the Y chromosome, together with such male determining factors as are carried by the autosomes, almost entirely overcome the female determiners on the X chromosomes. However, there is an abnormal response by the seminiferous tubules to the hormonal changes of puberty and they rapidly undergo recessive changes.[6]

Incidence

In one survey of patients attending an infertility clinic, 11% of all cases of high grade subfertility (sperm count less than one million per cubic ml.) encountered were found to be chromatin positive. Each of these showed testicular dysplasia and one third was of subnormal intelligence. This observation prompted a study to determine whether Kleinfelter's Syndrome occurred with increased frequency among the more severly mentally retarded population. A nuclear sexing survey in a mental deficiency hospital showed that this was the case, for 1.2% of males were found to be chromatin positive.

Types

The commonest type is XXY. However, other sex chromosome complements are found in chromatin positive Kleinfelter's Syndrome as shown below.

Sex Formula	*Sex Chromatin*
XXY	single positive
XXYY	single positive
XXXY	double positive
XXXXY	triple positive

In addition, the following mosaic forms have also been reported: XX/XXY, XY/XXY, and XXXY/XXXXY. In these cases the expression of the sexual phenotype is determined by the stem line predominating in the formation of the primitive gonads. In theory, it may be possible to have a male phenotype with the XO/XY type of mosaicism, or a female with the XX/XXY type of mosaicism, each unlikely to be recognized, except by chance.[6]

CONCLUSION

Gross aberrations of the sex chromosome complement are associated with severe reduction in germ cells. It is not fully understood how this situation arises. Two possible explanations are initial failure of differentiation of germinal cells, or degeneration of the germinal cells occurring during fetal life, early infancy, or at puberty.[7] The frequency of those conditions discussed in this paper suggest that this type of defect is a significant cause of human infertility.

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Abstract

Fine Structure of the Terminal Vascular Bed

Movat, H. Z., Fernando, N. V. P.: Exp. Molec. Pathol.

I. *Small Arteries*, 2: 549-563, Dec. 1963.

II. *Terminal Arterioles and Metarterioles*, 3: 1-9, Feb. 1964.

III. *Capillaries*, 3: 87-97, Apr. 1964.

IV. *Venules*, 3: 98-114, Apr. 1964.

In this series of four articles, the authors have described the fine structure of the terminal vascular bed as a foundation for examination of vascular changes in inflammation. The terminal vascular bed is composed of vessels between a terminal arteriole and venule and includes also the central or thoroughfare channel and the true capillaries.

The first article describes the morphological properties of small arteries which are characterized by a single layer of smooth muscle cells and an internal elastic lamina. The second deals with terminal arterioles and metarterioles which have no internal elastic lamina and the third with the true capillaries. Venules and their perivascular cells are described in the last article.

The authors have illustrated details of the electron microscopic anatomy of the terminal vascular bed with abundant electron micrographs and have implied the importance of some of their findings during the process of inflammation.

M.T.

The Infertile Couple

J. E. Kenzora 6T

Infertility or sterility means inability to conceive. The infertile couple is a term used to describe a man and women who practise normal sex habits, but fail to have any pregnancies after a period of 1 year.

INCIDENCE

Of all marriages about 15% or 1 in 6 prove to be childless. A further 10-12% will produce only one child despite the parents desire for more. A highly fertile couple will usually conceive within 6 months, and 4 out of 5 women will be pregnant within a year of commencing coitus without contraception.

A CONCEPT OF FERTILITY

In actuality the term *infertile couple* is inaccurate because in the majority of cases, thorough investigation fails to reveal any condition which will produce complete infertility in either partner. *Subfertile* may be a better term. Fertility is a relative matter in most marriages and depends on the sum of the individual potentials of the husband and wife. One partner who is highly fertile may compensate for the other partner who is of low fertility. The only absolute criterion for calling a person fertile is the production of a child. However, many factors must be present in order to conceive.

Maternal Factors:

1. Production of normal ova.
2. An open tract from vagina to ovary so that
   a. Sperm can asend the tubes and fertilize the ova.
   b. Fertilized ova can descend to the uterus.
3. A normal implantation site.

Paternal Factors:

1. A normal genital-urinary tract that is producing normal sperm.
2. Ability to have an erection.
3. Ability to ejaculate sperm into the female genital tract.

In most cases of childless couples, there are adverse factors present in both partners. Thus fertility, as well as sterility, is equal to the sum of the parts derived from each.

ETIOLOGY

(A) Predisposing Causes:

1. *Age*

Extremes of age, in the female particularly, are associated with relative infertility. Although a girl may start menstruating at age 13 or 14 she will probably be rather infertile until age 16 or 18. It is postulated that this is due to anovular menstruation. Again female fertility drops after age 40 presumably due to infrequent ovulation. (See Table 1.)

STERILE AFTER 10 YEARS (%)	AGE AT MARRIAGE (YEARS)					
	<20	20-24	25-29	30-34	35-39	>40+
	6.2	8.4	14.3	22.7	39.4	68.2

Table 1.

Male fertility falls slowly after the age of 40 although spermatogenesis continues indefinitely.

2. *Sex*

The female is found to be at fault more often than the male. However, in any good series where both partners were well investigated at least 40% of men were subfertile according to semen analysis. For every 100 men marrying, one is absolutely sterile.

3. *Gross malnutrition*

4. *Familial Predisposition*

If a female is an only child she has a 60% chance of bearing an only child if she marries.

(B) Specific Causes of Infertility:

MALE

Congenital Factors

a) Disorders of sperm development

i) *Germinal Aplasia.* Sperm cells are absent where as there are normal numbers of Sertoli cells. Cause may be lack of precursor cells or pituitary F.S.H. deficiency.

ii) *Spermatogenic Arrest.* The tubules and cell are normal; however the sperm fail to mature.

iii) *Peritubular Fibrosis.* For unknown reasons a very thick basement membrane surrounds the tubules perhaps interfering with cellular nutrition. The number of sperm cells is decreased.

iv) *Incomplete Spermatogenesis.* Some tubules and sperm cells are normal, whereas others are hypoplastic and immature.

b) Cryptorchidism

c) Varicocoele

d) Hypoplasia of the vas deferens

e) Hypospadias or phimosis

f) Mongolism

g) Pituitary defects or abnormalities eg. Laurence-Moon-Biedle and Fröhlich's syndromes

Acquired Lesions

a) Inflammations

Tuberculosis and syphilis of the testes, or gonorrhea of the epididimis can lead to sterility. Mumps orchitis rarely leads to infertility.[5]

b) Neoplasms

Benign or malignant tumours of the testes, vas deferens, or urethra are rare causes of sterility.

c) Trauma

Trauma associated with a fractured pelvis and a torn urethra is a frequent cause. Sterility may also result from surgery in the area eg. a herniorrhaphy which disrupts vascular supply to the testes. Retrograde ejaculation into the bladder usually follows prostatectomy.

d) Depression of testicular activity

i) Drugs, eg. sulphonamides can decrease fertility as well as nicotine.

ii) Irradiation.

iii) High temperatures are associated with subfertility eg. crytorchidism.

e) Endocrine

i) Hypothyroidism

f) Psychological upsets

i) Impotence

ii) Premature ejaculation

FEMALE CAUSES OF STERILITY

Congenital

a) Chromosomal abnormalities eg. Mongolism, Turner's syndrome.

b) Agenesis or hypoplasia of uterus or vagina.

c) Endocrine eg. anterior pituitary hypoplasia, Stein-Levanthal, or ovarian hypofunction.

d) Malposition of uterus and cervix (rarely)

Physiological

a) Prepuberty

b) Post-menopausal period

c) Lactation

Acquired

a) Inflammatory

Specific:

i) Salpingitis eg. tuberculosis, gonococcal

ii) Puerperal

iii) Endometritis eg. tuberculous

iv) Oophoritis eg. mumps

v) Cervicitis

Non Specific Adhesions:

i) Inflammatory

ii) Post-surgical

b) Castrate group

i) Surgical

ii) Irradiational

c) Endocrine

i) Hypopituitarism

ii) Hypothyroidism

iii) Cushing's syndrome

iv) Adrenal hyperplasia without Cushinoid symptoms.

d) Neoplastic

i) Large or bilateral tumours of the ovary

ii) Uterine tumours cause distortion of the uterus or tubes

iii) Faulty implantation of ova.

iv) Cervical tumours block the cervical os.

e) Psychogenic

i) Frigidity

ii) Secondary amenorrhoea

f) Coital difficulties (applies to both sexes)

i) Dyspareunia

ii) Coitus during sterile periods with abstinance during fertile periods.

iii) Apareunia—up to 5% of females in some series had not consummated their marriage.

iv) Infrequency of coitus.

v) Lubricants ie. jellies and greases decrease sperm motility.

vi) Sexual technique may be significant in couples of borderline fertility.

g) Miscellaneous causes

i) Malnutrition

ii) Chronic illness

iii) Endometriosis

iv) Adenomyosis

v) Cervical mucosal plugs.

MANAGEMENT[1]

It is all very well to define and classify infertility, but what can one do as a doctor if approached by a couple stating that they have not had any children and are worried. As with any other medical problem, there should be a set routine comprising all of the following:

1. Thorough history
2. Complete physical examination
3. Investigation

History

A general history and functional inquiry should be carried out before specific questions are asked concerning intimate matters (in order to relax the patient). In assessing fertility we must ask questions pertaining to the causes of infertility. Of particular importance are the patient's age, duration of marriage, and sex habits. With regard to sex habits enquire into the potency of the husband, ejaculation, frequency of coitus, and the specific time of the menstrual cycle in which it is practised. Questions concerning dyspareunia, previous pregnancies, and abortions are necessary. It is significant to know whether the husband has ever impregnated another woman, and whether the wife has become pregnant by another man.

Carefully record the menstrual history.

A complete history of the patient's past health with particular regard to pelvic operations and venereal diseases should be noted.

Physical

A complete physical with particular attention to the reproductive tracts is in order. If at this point any obvious abnormalities are discovered, they should be corrected by the examining physician or an appropriate specialist. Some couples present to their doctors too soon after marriage. This should be explained to them. Any misconceptions about timing of coitus can be corrected easily. Frigidity and impotence are emotional problems best dealt with by psychiatrists. Proper sexual techniques can be explained if indicated.

Investigation

If there is no obvious cause, as will be the case in the majority of couples, further investigation is in order. This should include:

1. Post coital test
2. Proof of ovulation
3. Proof of tubal patency
4. Sperm counts
5. Testicular biopsy

1. *Post Coital Test*

This is best carried out at the mid-cycle since more cervical mucus is present at this time. Instruct the woman to have intercourse, remain in bed one half hour afterwords, and then return to the doctor within 4 to 6 hours. The vaginal pool and cervical mucus are examined for the presence of sperm. A drop is placed on a slide and then a cover glass is applied. This is examined microscopically. Dr. Kerr states that if a large number of well formed highly motile sperm are seen, the male is not investigated further. (More than 20 sperm per high power field is good indication of male fertility).[3]

2. *Proof of Ovulation*[2]

Clinical Proof

a) Regular menstrual periods occurring with regular losses are usually indications that ovulation is normal. Irregularities suggest ovulation difficulties.

b) Ovulation pain occurring in the hypogastrium 12 to 14 days after the onset of menses.

c) Bleeding or mucus discharge at the time of ovulation is highly suggestive evidence.

d) Premenstrual mastalgia is related in some way to corpus luteum action.

Laboratory Proof

a) The endometrial glandular pattern changes from proliferative to secretory after ovulation. This can be detected by endometrial biopsy. (D & C)

b) Changes in cervical mucus. Estrogenic influence will produce a fern-like arborization (crystalization) on drying of cervical mucus smeared on a glass slide. Progesterone abolishes the fern pattern and suggests ovulation has occurred.

c) Temperature changes: the patient is given graph paper and told to chart her oral basal temperature using the same thermometer at the same time each morning for 3 months. In a normal female ovulation is preceed by a low peak, to be followed by a sharp rise of 0.4 - 0.8 F for the remainder of the cycle.

d) Hormone assays: these are done only if a woman has had no or few periods or if her periods are grossly irregular. Urinary pregnandiol levels greater than 2-5 mg. per 24 hours indicate ovulation has occurred.

3. *Tubal Patency Tests*

These are carried out 7-10 days following conclusion of a menstrual period to decrease risk of damaging a fertilized ovum and of embolization of materials used (CO_2, air, dyes).

i) Insufflation

This controls the injection of air or CO_2 through the cervix and uterus to see if it reaches the peritoneal cavity. Passage of air is determined by:

a) An initial increase of pressure in the system followed by a decrease if air enters the tubes and reaches the peritoneum.

b) Auscultation of air bubbling through the tubes.

c) Shoulder tip pain due to air irritating the diaphragm.

d) Radiological evidence of air beneath the diaphragm.

Failure to pass gas into the peritoneal cavity suggests both tubes are blocked; but the test must be repeated several times to make this diagnosis (at 3-6 months interval).

Accuracy: in one series in which each was repeated 3 times:

a) 37% of the negative results (ie. failure of air into the peritoneum) were wrong.

b) 12% of positive tests were erroneous.

ii) Hysterosalpingography

This method of radiological investigation entails injection of a non-irritating radiopaque dye via the cervix into the uterus and tubes. Spasm at the uterotubal junction may hold up the dye temporarily. This method tells the state of each tube and indicates any obstruction.

Accuracy: in one series there was evidence of bilateral obstruction in 86 cases.

15% of these were not obstructed.

In general this is a more reliable test than air insufflation.

iii) Peritoneoscopy or Culdoscopy

Direct examination of pelvic organs reveals some infertility factor in 30-50% of patients previously regarded as having normal genital organs. Some of these factors are peritubal or periovarian adhesions and endometriosis.

This procedure may be indicated if nothing is found by any other procedure.

4. *Sperm Counts*

If the post-coital test reveals good quality sperm in sufficient numbers nothing further is done. If the post-coital test is questionable regarding the quality and quantity of sperm, and the patient is willing, semen analysis is carried out.

A sample of sperm is collected by interrupted coitus or by masturbation into a clean dry glass after not less than 2 days continence. It is examined by an expert as soon as possible within 6-8 hours. This should be done on at least two occasions.

Sperm is studied according to:

i) Volume

ii) Number per cc.

iii) Motility

iv) Morphology

The final analysis is again a relative one, ie. a low percent of abnormal forms may compensate for a poor sperm count; and a high density, for a small volume. The following chart is a rough guide towards interpretation of a particular specimen. (see Table 2).

Pus cells indicate inflammatory lesions usually involving the prostate gland.

5. *Testicular Biopsy*[5]

If sperm are absent from the ejaculation, testicular biopsy may be indicated to differentiate intrinsic deficiency of germ cells from obstruction of the conduction system. It must be noted however that very few men are anxious enough about having children to undergo biopsy of a testicle. The operation is painful, and also is a source of embarrassment since their "manhood" is questioned. The highest percentage of unpaid bills in a urologist's practise is in the field of "investigation of sterility".

TREATMENT

Investigation will reveal correctable abnormalities in very few couples. Most appear normal by our present standards of investigation.

	Good Fertility	Moderate Fertility	Low Fertility	Very Low Fertility
Volume (cc.)	2-5	1-2	0.5-1 or >8.0	<0.5
Number per cc.	>60 million	30-60	<30	<10
Motility at 6-8 hrs. (%)	>40	>30	<30	<10
Normal Morphology of Head, Body and Tail (%)	80	50	<50	<50

Table 2.

In the female, there are two main clinical groups amenable to treatment[7]:

i) The amenorrhoeic group (primary and secondary)

ii) Blocked tube group

SECONDARY AMENORRHOEA:

In the first group there are females who on investigation are physically and hormonally normal but do not menstruate, but have once menstruated regularly. Often when these women are put on sedatives and tranquillizers they will menstruate and later conceive.

PRIMARY AMENORRHOEA:

There is another group who have no other gross endocrine disease except amenorrhoea, and appear completely normal physically. This group may be hormonally abnormal. However assays for human gonadotrophins (leuteinizing hormone) are low or absent. They have been treated with human gonadotrophins with some degree of success. However this natural hormone is very difficult to obtain and is also very expensive. Pregnancy rate[9] with this is 18%. A new synthetic called "Clomid" (Clomiphene citrate[8]) is now under clinical investigation. Using this drug, about 80% of this group of females can be made to ovulate due to its gonadotrophic leuteinizing action. Of these, from 10-20% will eventually conceive, where formerly none conceived.

Primary amenorrhoea due to anatomic deficits of the reproductive tract itself are not amenable to therapy.

BLOCKED TUBE GROUP:

With regard to the blocked tube group success rates i.e. birth rates of 5% can be obtained following surgery to open up the passages. There is, however, a very high incidence of ectopic pregnancies which partially account for this low birth rate.

If the cervix is in abnormal position, use of a pessary or surgical correction sometimes increases fertility.

In the male the only groups that can be treated successfully are:

i) Those with definite hypothyroidism

ii) Those with an obstruction in their genital tract with normal spermatogenesis. Drugs and vitamin pills so far have proven unworthy.

As far as the remaining couples are concerned, the only thing the physician can offer is hope and encouragement to keep trying. The physician should never incriminate either marital partner if he can avoid it. Eventually adoption may be advised.

Artificial insemination has been undertaken by some but because of strong legal, religious, and psychological reasons it is not popular.

ACKNOWLEDGMENT

I would like to thank Drs. J. L. Harkins, W. K. Kerr and R. Volpe of the Toronto General Hospital for their kind assistance in the preparation of this paper.

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Recent Advances

Gastrointestinal Motility

Numerous methods have been used to study the mobility of the gastrointestinal tract—radiology, balloons, catheters, radioitelemetering capsules etc. This article reviews the findings of Deller and Wangel who made use of intraluminal pressure recording catheters along with image intensifying cineradiography.

Method:

Three polythene catheters were fixed together so that one had an opening at the distal end and the other two opened 7 and 14 cm. above this. By means of transducers and a polygraph, the intraluminal pressure could be recorded. Cineradiography was used simultaneously.

Classification of GI Waves:

Four types of waves were described: type I had a small amplitude and short duration; type II, longer duration and greater amplitude; type III, an elevated baseline pressure on which types I and II are superimposed; type IV is similar to type III except there are no superimposed waves.

Normal Small Intestinal Pattern:

In the small intestine, analysis of the pressure tracings showed that type I and III waves were prominent and that the basic pattern was a burst of type I waves at 11-12/minute. On cineradiography, segmenting movements (type I waves) were associated with some transport of contrast medium a few cm in either direction. No classical peristalis was seen (wave relation preceeding a slowly progressing contraction); however, occasionally the contrast medium was advanced 10-20 cm in 1 second. Since there is a higher activity in the upper small intestine than in the lower intestine, it is postulated that a pressure gradient between the proximal and distal segments is responsible for the transport of intestinal contents.

Normal Large Intestinal Pattern:

The large intestinal wave pattern was mainly type II. Motor activity was increased by food, emotions, and Prostigmin. Less frequent contractions were seen radiologically, and they didn't cause major changes in the outline of the viscus.

Dumping Syndrome:

In patients experiencing the dumping syndrome, the resting small intestinal activity was normal. With the ingestion of food, small intestinal activity was depressed for about 15 minutes. With the disappearance of symptoms, type I activity returned. Cineradiography verified that during the dumping syndrome, there were few small intestinal contractions. It has not been determined if hypomotility is the cause of the dumping syndrome or whether it merely accompanies it. The mechanism postulated on the basis of these studies for the production of the dumping syndrome follows: rapid emptying of the gastric remnant presents the proximal part of the small intestine with a large amount of hyperosmotic solution. Fluid leaves the extracellular space, the plasma volume falls, and cardiovascular symptoms result. It has also been suggested that the initial motor activity of the small intestine served to bring the hypertonic solution into contact with the proximal small intestine. Subsequent hypomotility allowed the food to remain in the upper small intestine where fluid diffusion is greatest. (Others have postulated the release of a humoral substance like adrenaline which decreased gastrointestinal motility and caused the dumping syndrome.)

Irritable Colon Syndrome:

This refers to a number of conditions with no organic lesion. Functional diarrhea and spastic colon are considered as possibly variants of a similar process. In spastic colon, pain is prominent, and constipation alternates with diarrhea or periods of normal bowel habits. Functional diarrhea is associated with little pain, but diarrhea is continuous or intermittent. Transport of intestinal contents is postulated to be due to a pressure gradient between the proximal and distal large intestine.

In spastic colon and organic constipation, higher levels of activity were noted in the distal sigmoid and rectum. In functional diarrhea, lower activity was observed. In these two cases, constipation or diarrhea may be the result of abnormal pressure gradients.

The authors investigated three possible etiological factors in the pathogenesis of the irritable colon syndrome:

Emotion was not felt to be etiological factor since GI motility increased to the same degree in the control group as in patients with irritable colon syndrome. Since also, patients with both organic and functional diarrhea found their symptoms to be aggravated by emotion, emotion was not felt to be the fundamental cause but only an aggravating factor. *Increased susceptibility to parasympathetic stimulation* as a possible etiological factor seemed unlikely since with Prostigmin stimulation there was a negligible motor response. *Intolerance to food* was present in many of the patients with irritable colon syndrome but no good correlation between administra-

tion of food and altered activity of the colon could be found.

SUMMARY

There is much to be learned about the motor activity of the gastrointestinal tract; and the methods of intraluminal pressure recording and cineradiography will increase the undestanding of physiology and pathophysiology.

K. W. Johnston 6T6

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On the Nature of the Feminine Mystique, the Female Orgasm, and Frigidity

B. Raxlen, B.A. 6T5

"the bed was inhabited by an indistinct mass of flesh moving in many places at once, vaguely stirring like an ant heap . . . they lay there like victims of some terrible accident, clumsily engaged, as if in some incoherent experimental fashion they were the first partners in the history of the human race to think out this peculiar means of communication . . . a disposition of bodies as breathlessly congruent as a ballet-position, But nevertheless I recognized that this had been fixed immutably, for all time—this eternally tragic and ludicrous position of engagement . . . "

LAWRENCE DURRELL . . . *Justine*

This paper will deal with three major areas of inquiry. The first will be a discussion of the effect that cultural values and personality have upon the concept of femininity and sexuality. The second will be an outline of the anatomical, physiological, and psychological nature of the female organsm. The third will be a discussion of the etiological and psycho-pathological significance of the symptom of frigidity with its relation to the lack of intensity or absence of the female organsm.

Sexual behaviour is a subject not only thrown frivolously about in beer pubs, locker rooms, and female pajama-parties, but also a subject which in recent years has been the target of considerable 'professional' (psychiatric, sociologic, psychologic and anthropologic) investigation. The sexual process (sexual urge and expression) with its infinite social and psychological ramifications is something to which all human beings must adjust. Unfortunately, in our society, many times the adjustment is totally inadequate. Individuals suffer from inner conflicts, feelings of guilt, and frustrations which hinder their spontaneous enjoyment of the sexual act. The reasons for this maladjustment are as legion as are the different personalities of the specific individuals involved. However, one of the major factors contributing to the problem of sexual inadequacy, particularly in the female, is the amount of confusion which abounds in regard to the relative normality, acceptibility and psychological wisdom of various forms of sexual expression. There is a great uncertainty toward sexual behaviour, especially regarding what constitutes correct and proper conduct. Freud, of course, opened new worlds in the study of human behaviour with his classic works on the conduct and nature of man's unconscious drives with specific emphasis on the family-historical factors. But Freud has been often misinterpreted. Many of his theories have been taken out of context, distorted, and incorrectly popularized. Other theories of Freud have been refuted and replaced by new and more dynamic concepts. These concepts have reached the specialists and a few highly educated members of our society—but the general public remains totally ignorant of the evolution and implications of these teachings. Hence the public's notions remain foggy, filled with folk-lore and incredibly naive. What is worse, these misguided notions are handed down from generation to generation.

Another revolution came about in 1948 when Kinsey et al published their revelationary statistical analysis of the *Sexual Behaviour of the Human* (American) *Male*, followed by studies on the female in 1953. Both books contain a multitude of impressive statistics concerning diverse patterns of sexual behaviour. These quantitative aspects of sexual conduct helped the investigator to understand *how many* people shared in a particular form of sexual activity. Hence by understanding what was statistically prevelant in our society, certain forms of behaviour could be interpreted based upon their frequency of occurence. Albert Ellis in an article entitled *What is Normal Sexual Behaviour?*, sums up his thoughts by stating "normal" sex behaviour from whatever view, amounts to *socially approved* behaviour. Statistically normal sex activities are activities which society has made statistically prevalent. But to know statistics is not enough. From the stand point of psychological health, what is important is the relationship between the personality characteristics and the mode of sexual expression. Maslow states, "it would appear that no single sexual act can be called perverted or abnormal *per se*. It is only abnormal or perverted individuals who can commit abnormal or perverted acts. That is, the dynamic meaning of the act is far more important than the act itself". Sex normality is a relative, culturally conditioned phenomenon and no mode of sex behaviour is absolutely, finally, and for all times and places normal or abnormal. Groups which think various types of sexual behaviour normal or abnormal automatically tend to make them so. Or as they say in French . . . "honi soit qui mal y pense!"

Another Gordian knot which must be unravelled before the above study can be undertaken is the concept of the *sex drive*. One must distinguish between sexual capacity, sexual performance, and sexual drive. A clear distinction must be made between what one can do (capacity), what one does do (performance), and how strongly one desires or strives to perform (drive).

Lester A. Kirkendall, in his article "Toward a clarification of the Concept of the Male Sex Drive", discusses the triad fo capacity, performance, and drive in the following manner. He believes *sexual capacity* to be the ability of the nervous system and the muscular systems to respond to a sexual stimuli by orgasm, and to recuperate from that experience to the point where the orgasm can again be experienced. This represents the actual physical difference between individuals sexually. Physiologically, some persons are able to have more orgasms and to recuperate from them more quickly than others. Another measure of capacity is the frequency of orgasm within a very limited period of time and the possibility of achieving multiple orgasms. The average male has one orgasm and considers no more possible.

The second component, *sexual performance* again measured by orgastic frequency, leaves little doubt that for males the highest level of sexual performance is during the period of adolescence. But performance is directly related to many psychological factors which are unrelated to the physiological capacity of the nervous system to respond. Kinsey's data shows that for single males the frequency of sexual outlet declines and approaches the level of single females in middle age. Another real limitation to performance is the absorption in non-sexual pursuits, such as business or a career.

The third component, namely *sex drive*, can now be seen as a psychologically conditioned state enhanced by a certain physiological make-up. Sex drive varies considerably from time to time, even in the same individual. These variations seem more related to psychological factors than any others. For example in middle -aged people particularly in some females who have undergone menopause, there is an increased sexual desire. Perhaps the direct influence of hormonal changes have a basic biological effect. Other factors such as decreased fear of pregnancy may play a strong role. Men, fearing the ravages of old age, and viewing sexual performance as synonymous with youth, may experience a strong upsurge of sexual drive. Individuals who are maladjusted, conflict-ridden and under severe degrees of tension often find themselves hard-pressed to curb their sexual desires. In contrast, young virile healthy and vigorous adolescent males free from conflict, have no real difficulty in handling their sex drive.

At this point, we must stop and re-assess what has just been said. The first major point that this article wishes to stress is that sexual behaviour, although a fundamental biological urge, is shaped from an infinite variety of variations by the values established by a particular society or sub-culture. Sex drive owes no allegiance to either male or female appetites, but is conditioned by specific life circumstances. In its simplest terms, normal sexual behaviour is a culturally conditioned phenomenon—with sex drive being its psychological counterpart. If this statement is accepted, then it raises more very interesting questions. The first is to what extent is the concept of "femininity" biologically determined. To what extent is it culturally imposed? I there an inherent biological (physiological and hor monal) difference as to what constitutes *sexuality* in th male and female, and how much of this is culturall determined? The answers to these questions are no simple, but they are essential in the understanding o this topic.

Simone de Beauvoir, the brilliant French femal companion of Jean-Paul Sartre, discusses these ver problems in her erudite book the *Second Sex*. Some o her piercingly original ideas are worth noting. First sh begins with the data of biology, "the two gametes play a fundamentally identical role; and, it is the male ele ment which provides the stimuli needed for evokin new life. And it is the female element that enables thi new life to be lodged in a stable organism. The fe male is entrusted with the protection of the egg. He body becomes a resistance to be broken down, and th male penetrating the female asserts his domination. The female submits to coition; the sexual adventure is experienced by her as an interior event. The sperm becomes a stranger to the male, and separates from hi body; the male recovers his individuality intact at th moment when he transcends it. The egg on the contrary, becomes fertilized . . . then implanted. Firs violated, then alienated—the female becomes in par other than herself. She carries the foetus inside her abdomen." In a sense part of the female individuality i lost, in that she renounces it for the benefit of th species.

In consequence of the primary sexual characteristics, woman has various secondary sexual characteristics which are produced through hormonal action. She is more delicate; her hormonal balance is much more tenuous, being related to the pituitary-ovarian axis. Hence irregularites of the endocrine system are much more likely to react secondarily on the autonomic nervous system . . . giving a greater degree of instability. This lack of stability underlies female emotionalism, hence the sudden burst of tears, the blushing palpitations, nervous head-aches and menstrual irregularities. The crises of puberty, such as the growth of breasts and the onset of menstruation, pregnancy, child-birth, and menopause, make these distinguishing biological considerations most important. There is no doubt that female physiology constitutes an essential element in her mode of existence. But, does the answer to the feminine mystique and concepts of feminity lie in her physiology alone? Simone de Beauvoir devotes her whole book to refuting this psycho-physiological parallelism. She states: "Certainly these facts cannot be denied, but in themselves they have no significance. . . . Once we adopt the human perspective, interpreting the body on a basis of *existence*, biology becomes an abstract science: whenever the physiological fact (muscular inferiority) takes on meaning, this meaning is seen at once as dependent on the whole context. Man establishes the "truth of

facts," but now he deals with them: nature has reality for him only to the extent that it is involved in his activity . . . *his own nature not excepted.*" Hence with the female, how do we measure for example the burden of the reproductive function? Maternity need not be the sole function and lifetime accomplishment of women. The bondage of women to reproduction depends upon the number of births demanded by society. The possibilities in the female individual are governed by the dictates of the economic, religious and practical situation of the moment. Certainly this is most strongly illustrated in the vital area of birth control which is basic to the whole problem of the female way of life. Economic considerations in the under-developed countries make birth control a modern necessity. Yet the whole issue rages with religious controversy. The moral guilt by using contraception, or the fear of yet another pregnancy without the use of contraception combined with obligation to one's husband, and the gratification of basic urges become insufferable burdens on the female. Psychologically she becomes unfit for any enjoyment in the sexual act. A concluding statement from Simone de Beauvoir is in order. "The body of a women is one of the essential elements in her situation in the world. But that body is not enough to define her as a woman . . . we are concerned to find out what humanity has made of the human female."

Philosophically, the *Second Sex* stands as an important contribution to world of the female, and the quality of her existence. However, can the problem of female sexuality be dealt with in this frame of reference? Can the thesis of Simon de Beauvoir be substantiated by independent investigation? The significant work of Dr. A. H. Maslow in field of sexual behaviour seems to answer in the affimative. The essence of the particular study which will be briefly quoted, illustrates that among human beings (as in the case of the infra-human primates) a close relationship exists between *dominance feeling* and *sexuality*, and incorporates the very important role that personality plays in sexuality.

There are three sets of terms which must be defined in Maslow's work. The first is *dominance-feeling* (self-esteem). This involves good self-confidence, self-assurance, high evaluation of self, feelings of general capability, lack of shyness, timidity, self consciousness, or embarrassament. *Low dominance feeling* is seen as the opposite of the above, and is characterized by the lack of self-confidence, self-assurance, and self-esteem. These people tend to be more shy and timid, more inhibited, conservative and conventional. They are generally more silent, and tend to be incapable of normal easy going behaviour. *Dominance-status* is an expression of social position with respect to another person. The person in dominance-status feels stronger and more adequate. The dominated or less adequate person is said to be in subordinate status. *Dominance-behaviour* is more difficult to define. Examples of dominance behaviour are bursts of temper, aggressive behaviour, insistence of one's rights, free expression of resentment or hostility. The method Maslow used for gathering his information was the intensive semi-psychiatric interview. The following variables were studied on the basis of direct questioning and rating scales with certain specific criterion were established.

1. Rating for dominance-feeling (or self-esteem)
2. Rating for sex drive.
3. Rating for sex attitude.
4. Rating for presence or absence of technical knowledge (if marriage, whether or not virgin at time of marriage).
5. Promiscuity (number of men with whom sex relations were had).
6. Presence or absence of any history of masturbation since puberty, no matter how infrequent.

Rating for the sex drive was arrived at by the accumulation of the following data.

1. Frequency and intensity of local genital reactions (through intercourse or masturbation).
2. Percentage frequency of climax in heterosexual acts: the ease of attainment; the kinds and amount of stimulation required to have a climax; its intensity (overt loss of control, sounds etc.).
3. Number and extent of erotic zones reported by the subject.
4. Number of everyday stimuli, consciously regarded as sexual stimuli.

Below are some of Maslow's findings.

a) *Religious Differences:*

When subjects were very religious, of any faith, they were more apt to be virgin, not to masturbate, and to have lower ratings for sex attitude. Differences in educational background, geographical factors, and parental teaching all contributed to the differences in ratings.

b) *Homosexual behaviour:*

With women of very high dominance feeling the probability is much higher for either active homosexual episodes, or else conscious tendencies, desires, or curiosity. Maslow states that an interpretation of homosexuality in terms of "dominance" appears to be far more valid, than a purely physiological interpretation.

c) *The influence of the sexual position:*

Many women of high dominance feeling are tremendously stimulated by assuming the 'above' position in the sexual act; such behaviour is unthinkable for women low in dominance feeling. Also the face-to-face position with the male above the female carried dominance meaning for the male. However, the almost universal prevalence of the ventro-ventral position as determined by cross-cultural studies, indicates closer, more friendly, more equal relationships between the

sexes. Other less obvious conclusions were also made. For instance in certain women whose high self esteem is of the *ego-secure* type, the below position seems to carry with it *no* implication of submissiveness, nor the above position any implication of dominance. (ie. the sexual act was not for them a dominant act.)

d) *Dominance in sex and marriage:*

The best marriages appear to be those in which the husband and wife are at the same level of dominance feeling, or with the husband somewhat higher. In those couples where the wife was definitely dominant over the husband, trouble was likely to ensue in the form of both social and sexual maladjustment. There was a greater incidence of divorce amongst these couples. Divorced women on the average, were high in volitional strength, self-assertiveness, initiative, self-reliance and ambition.

Some interesting findings were uncovered in relation to promiscuity. Married men and women who were sexually promiscuous were quite sure that sheer sexual pleasure and satisfaction were for them confined to the relations of the spouse. Other emotional needs were satisfied, by this activity, particularly the desire to conquer, to collect scalps. Hence these hasty conquering affairs were not looked upon as sexual affairs . . . but rather 'dominance activities'. The concept of the Don Juan who constantly bolsters a sagging ego by flaunting his sexual prowess is substantiated by this investigation.

e) *The meaning of the sexual climax:*

In mid-dominance feeling and average sexuality, the presence of orgasm is a fairly good sign of a feeling of "love" for the husband. If the female does not feel loved and secure, the orgasm will be inhibited unless she is strongly sexed. Other subjects who had strong dominance-feelings, a strong sex drive, and who felt dominant to most men, reported lack of orgasm with most of them. They go to extreme lengths to show that they do not care, i.e. chewing gum or smoking cigarettes during the sex act. In the homosexual subject the induction of orgasm in her partner was the high spot of the encounter . . . and the goal toward which all her activity was pointed. From the above data one secs that the orgasm has psychological values for the woman. With it she may feel that she is 'giving in', or making herself vulnerable, and is assuming a subordinate status. Maslow is quick to point out however, that in equal or secure marriages, these feelings and distinctions are strikingly absent. "In this type of marriage the concept of dominance is of little use."

f) *Ideal lovemaking:*

With high dominance women they need high dominance men to sweep them off their feet. They report that they prefer straightforward, rather violent, animal passion. They must be taken quickly and sometimes brutally. Favors are taken, not asked. In other words they must be dominated, and forced into a subordinate position. For the middle-dominance female, more prolonged wooing is necessary (ie. soft music, wine, and kisses). As Maslow states "so marked are these differences that one could say with some inaccuracy but with illumination, that high dominance women unconsciously wish to be raped; the middle-dominance female wishes to be seduced. The low-dominance female basically uses sex only for reproductive purposes, and to please her husband."

g) *Sexual tastes, attitudes and behaviour:*

On one extreme Maslow found that in high dominance marriages, there was the highly pagan, positive, uninhibited approach to anything sexual. These people love sex for its own sake, approve of all aspects of it, and experiment widely. Maslow states that "very frequently, in a marriage between high dominance people, practically every form of sexual behaviour known to the psychopathologist is tried (ie. curious positions, sodomy, homosexuality, cunnilingus, fellatio, sadism-masochism, exhibitionism and even coprophilia). These acts have no pathological tinge nor are they pathogenic in any way!" For the low dominance, insecure marriage, the other extreme is the case. The attitude is highly Puritan, inhibited, negative and rejecting approach toward sex. Frigidity and sexual frustration are very often the end-product of this approach. Thus we may characterize high-dominance people as unihibited, or unrepressed; people whose fundamental impulses, come out freely in diverse behaviour. Low dominance people are far more strongly socialized or inhibited.

The above data which has just been presented again throws a very different light on the whole problem of sexuality. We see how important is the place of personality in determining the intensity and the mode of sexual behaviour. Maslow reaches the general conclusion from his work that sexual conduct and attitudes are more closely related to dominance-feeling than to sheer sexual drive in the individual. In yet another article, he expands on his dominance-subordination theme. He states that the healthiest attitude toward sex is one in which there is a differentiation of dominance from sexuality. These two areas of life should be separated in marital thinking. Sex should not be viewed as a conquest in which the female must surrender in order to prove a man's masculinity. The male must learn that by penetrating his wife he has neither conquered, nor asserted mastery. Maslow's findings and conclusions substantiate the philosophical and literary thinking of Simon de Beauvoir. Her own words could well be the conclusion of some of Maslow's studies. "Woman is determined not by her hormones or by mysterious instincts, but by the manner in which her body and her relation to the world are modified through the action of others than herself. . . . If we imagine a society in which the equality of sexes would be concretely realized, this equality would find new expression in each individual."

THE NATURE OF THE FEMALE ORGASM

With the preceding background let us begin the discussion of the female orgasm by using as a standard of comparison the physiological and anatomical attributes of the male orgasm. In the male there is an orgastic spinal eentre in the saeral segment of the spinal cord. Discharge of semen or ejaeulation can arise two ways. First through simple meehanical stimulation of the glans penis. This is purely a spinal mechanism. The seeond mode of ejaeulation oeeurrs at a higher level. This is brought about by psyehologieal stimuli on the higher eortical eentres. Hence sueh things as erotie literature, dreams (with nocturnal emissions), even antieipation of sexual eontaet may eause an orgasm without the primary mechanieal stimulation of the glans penis. In normal sexual relationships the orgastic response of the male is governed by a eombination of both neurological faetors, namely spinal and cortieal. Ejaculation is the final result of eontinued meehanieal stimulation and psyehie exeitement. Reflex centres in the spinal ehord begin to emit rhythmical impulses (sympathetic) which leave the chord via L-1 and L-2. They pass to the genital organs via the hypogastrie plexus. Ejaeulation begins with peristaltie eontraetions in the testis, epididymis, and the vas deferens to cause expulsion of sperm into the internal urethra. At the same time the seminal vesieles and the prostate eontraet along with museles at the base of the ereetile tissue to expel the seminal and prostatie fluid.

The above deseription deseribes a purely physiologieal sequence of events; it is eommon knowledge however that psychologieal distraetions in the male, whether they be of a minor or major nature, can cause sexual inadequaey. This inadequaey ean take the form essentially different from orgasm obtained through elitoral stimulation. Are the orgasms experieneed in these two ways distinct in nature and quality? Other writers on this topie aeknowledge the experienee of two kinds of orgasm. One of a relatively mild intensity, and the other of a more intense and deeper nature. Without delving into the morass of eontroversy on the subject, the other main sehool of thought regarding the differenees between the two types of responses is basieally the following: the female of the human speeies is anatomieally and psysiologically equipped to experience intense orgastie sensations. The quality of these sensations may vary however aeeording to the patient's psyehie milieu. This psyehie state depends upon the faetors governing the atmosphere of the partieular situation, the sexual baekground of the female and the sum total of her cultural inhibitions. Without diseussing the dynamies of frigidity, let us use this sexual upset to illustrate the mechanisms involved in the orgastie reaetion. If a strong, deep-seated psychologieal deterrent exists, whether through guilt, anxiety, hostility, or sexual ambivalenee, the orgastic mechanism will be totally inhibited, or neurologically speaking the influenee of cortical centres will be so great as to inhibit even the spinal reflex meehanism from the elitoris through to the orgastie eentre in the spinal cord. If some psyehologieal inhibition exists, but not to an overwhelming degree, then the meehanieal stimulation of the aet of intercourse on the elitoris and vagina will initiate orgasm at a lower spinal level. These somewhat inhibited women experienee orgasm of a elitoral type (ie. lesser intensity)—but they experienee some form of orgasm none the less. This type of lesser response can be present in normal healthy women with no psyehologieal problems. Interviews with patients have revealed that "it all depends on the situation". In some instanees, sexual intereourse is looked upon as a frolieking game, filled with frivolity and slap-stick abandon. The situation ealls forth a less intense response. On other oeeasions the sexual aet is viewed by the same eouple as a solemn and saered love ritual. Then the emotional stimulus is greatly heightened, there is enhaneed cortieal exeitement, both elitoris and the interior of the vagina are meehanieally stimulated, and the woman abandons herself to the eonvulsive, shuttering intensity of an enriehed orgasm. The female will then have experieneed what has been ealled the *vaginal* orgasm.

Previously this coneept of the vaginal orgasm carried with it the implieit assumption that the physieal stimulation was due to vaginal intereourse, and the vaginal wall and mucosa were being exeited. However, the clitoris is also stimulated and remains an important faetor in initiating the orgastrie response. Henee, the differenee between the so-ealled elitoral and vaginal orgasms are explieable not in terms of the different origin or loeation of the orgastrie response but in terms of different intensity and the degree to whieh cortieal faetors are eontributory. As in the male, the inhibition (impotenee) or intensity varies with the degree of psychological stimulation present. And again as in the male, the female orgasm may be possible without any genital stimulation whatsoever. (ie. clitoris or vagina). Orgasm may be elieited in some females by nipple suetion, kissing, by genital manipulation of the male, or even in dreams, or sueh abstraet situations as having a shampoo and sealp rub by a male hair-dresser. One may safely say therefore, that the actual spinal mechanism is identical in all females and variations in the orgastic response are due to the degree of psyehie faeilitation or inhibition.

FRIGIDITY: FUNCTIONAL DISTURBANCE IN SEXUAL LIFE OF THE FEMALE

Like all topies of eontroversy, frigidity goes by many definitions. In this artiele when frigidity is spoken of, the term will mean a neurotie condition manifested through a psyehosomatic sexual illness. Thus this term does not refer to any single eondition, but rather a wide variety of phenomena ranging from severe phobie abhorenee of the aet of intereourse with vaginismus, to eases where the sexual act may be pleasureable in varying degrees, but without orgasm. As stated before,

Bergler in accordance with Freudian psychology defines frigidity even more rigidly . . . "the sole criteria of frigidity is the absence of *vaginal* (most intense) orgasm". Although essentially both definitions say the same thing, this paper will adhere to the latter one for purposes of classification.

The classification of frigidity by Hitschmann and Bergler is as follows:

a) *Organic frigidity:*

This is a relatively small group of conditions which on the basis of tissue pathology limit or destroy the capacity for sexual contact and enjoyment. (i.e. a systemic illness, destructive process such as a neoplasm, an acute infection of the Bartholin glands, or prolapsed uterus). Thus initially the female in question should undergo a complete physical and gynecological examination to rule out any organic disease.

b) *Psuedo-Frigidity:*

Again the orgasm does not occur, but its lack is not caused by any inherent impairment either physically or psychologically on the part of the woman. The absence is due to ignorance of sexual technique, false sexual theories, and male impotence (failure to sustain an erection or premature ejaculation). This state can be corrected by simple retraining of the couple concerned.

c) *Facultative Frigidity:*

In this instance, orgasm may occur, but only with certain men. For example a wife who obtains no sexual gratification from her husband, may with other men be able to sustain an intense orgastic response during an illicit affair.

d) *True Frigidity:*

This group comprises virtually all of the problems of so-called frigidity. Bergler distinguishes a number of sub-groups:

1. Total frigidity with vaginal anaesthesia:

This is the severest form of the condition. Sexual intercourse is entirely without interest. There is no hint of clitoral or vaginal pleasure. The act is looked upon with revulsion and disgust, simply as a submission to the male partner. The female wishes to get it finished as soon as possible. There is no foreplay, and if there is, no sensations arise from the erotic zones. Usually there is a lack of normal lubricating glandular secretion from the vagina, and artificial lubricants are used. There is absent-mindedness during the act, and total lack of participation. This condition carried to its most pathological extreme, results in vaginismus. To the unhappy bewilderment of the male partner, the female musculature of the vagina and the pelvic floor go into spasm—even to the point of preventing penetration. If there is penetration, it is always associated with intense discomfort and pain (dyspareunia) or there may be immediate nausea, vomiting or fainting. The woman may cry out pleading with her husband to stop. This is a serious psychiatric situation and may be looked upon as a conversion hysteria problem. Often this condition arises from early childhood trauma of a severe and distressful nature (i.e. penetration of the vaginal canal in youngsters by foreign objects have been found in the history of more than one-third of the cases).

2. Total frigidity with vaginal hypoesthesia:

The patient experiences slight excitement at the begining of coitus. This excitement remains at the same level throughout the act. There are traces of glandular secretion, with slight sensitivity of the clitoris. There are no involuntary muscular contractions.

3. Relative frigidity with vaginal hypoesthesia:

The patient is responsive in this condition; may experience definite excitement at the thought and expectation of coitus, but once in bed is fearful and unable to react. At a high level the patient experiences true vaginal sensitivity, but there is sudden cessation of excitement just before the onset of the orgasm. Finally patients may be stimulated via the clitoris by the mechanical contact of intercourse and experience a less intense type of response. No vaginal orgasm is experienced however. In many cases the coital movement does not make sufficient contact with the clitoris of the vagina. The female's personality inhibits her from assuming the female dominant position, which renders her most susceptible to clitoral orgasm and not allow her husband to help her attain relief from her sexual tension by manual manipulation of her clitoris. This may have resulted from a strong parental reaction to self-masturbation. In some cases dreams may liberate the trapped orgastic response.

4. Nymphomania:

Pity the man who finds himself in the clutches of a nymph! The age old dream of every post-pubertal youth and frustrated medical student would soon become a nightmare. The 'nymph' is an insatiable woman who is never fulfilled, and who never reaches orgasm. She frantically exhausts all male comers, taunting them, urging them to fill the void which is not sexual at all, but spiritual and psychological. Usually the male is unaware of this creature's psychopathology, and his inability to satisfy her, particularly if he is a novice leads to feelings of his own inadequacy . . . and eventual impotence.

6. Sexual Perversion—Lesbianism:

In this situation the female is incapable of obtaining an orgasm with a male partner. But with a female full orgastic response is possible.

Incidence

Opinion varies as to the incidence of frigidity. Some sources state that one woman out of every three obtains vaginal orgasm (the most intense response) while three out of four get clitoral satisfaction. Other figures are higher. Knight states that 75% of all married women de-

rive little or no pleasure from the sexual act. Williams divides the married female population into three approximately equal groups. The first whose adjustment is near perfect do experience vaginal orgasm. Those who occasionally welcome sexual contact rarely obtain orgasm in normal coitus. Finally there are those who never have normal coitus, and whose feelings are always of disgust and revulsion. Although statistics are highly inadequate and inaccurate in this field, one fact is quite obvious, namely that the gravity of the problem and its prevelance among married women raise it to epidemic proportions. When one considers the tremendous importance placed upon sex in our society, then the problem of frigidity with all its ramifications becomes more than an academic exercise. Every physician should be alerted to its presence for it may present in subterranean and devious ways. The corroding effect that this neurotic illness may play on a marriage, will result in marital discord, infidelity, and divorce.

Etiology and Psychodynamics

a) *Psychological Factors*

To understand this problem more clearly it is necessray to review briefly the psychology of female psychosexual development. It is here, in the unique evolution of the female personality, that the seeds of sexual destruction are sown. This process is enacted in every growing female child. The way the child learns to respond to universally common female predicaments, will result in her orientation to the world, and her personal expression of femininity . . . especially her future attitude toward sex.

At the beginning of this article the point was made that sexual behaviour, is a mode of conduct which is selected from values of a particular society. Society will also erect strict guide-posts for correct feminine, conduct. A certain *female image* will be created by society and reinforced, augmented, or changed according to the particular religious, economic, and family situation. Certain general principles overt in American or European society can be enunciated. First, for the female there is an increase in restrictions, warnings and moral discipline. The male is a much freer and independent individual. Second both in pre and extra-marital experiences the female is forced to accept the 'double standard', and is subject to great social disgrace and condemnation should she break with this convention. Thirdly, her major social function remains maternal, and her individuality is submerged in this all-encompassing role. Finally she is subjected to more physiological upheavals, increasing the chance for greater psychological instability. (i.e. puberty, menstruation, loss of virginity, pregnancy, trauma of child-birth, lactation, and finally menopause). All these factors must be recognized and overcome as the female makes her way in the world. It can be seen that society demands a subordinate role for the woman. She is already in conflict!

b) *Personal Factors*

Again, there is no one theory which completely encompasses this complex subject. Freud's theory is that the essence of female libidinous development stems from the anatomical differences in genitalia. The little girl's discovery of the absence of a penis, is looked upon by her as abnormal. To her this lack is viewed as a punitive deprivation by her parents and results in the female castration complex. She clings to the fantasy that she will grow one later. As the female child grows she is subject to the Oedipal conflict, and antagonistic feelings develop such as love and hate towards parents and other siblings. Depending upon the pathology inherent in the family situation, the female child may learn distorted sexual theories, and develop neurotic attitudes and attachments. The woman's substitute for the penis becomes the clitoris, complete with all the erotic sensations evoked during self-masturbation. As was mentioned before, Freud believed that the fixation of the libido on the clitoris, in early childhood, give rise to a more primitive and less intense form of orgasm in married life. Modern schools of psychiatry however disagree with the primary emphasis Freud placed on the comparative anatomical differences between male and female. They believe that the female genitalia are themselves the primary factor in female psychology. The first biological fact discovered by the female child is that the vaginal cavity is a hollow recepticle. The denial or lack of discovery of it is said to result from fears of large objects which might be introduced. These fears although they take the form of fantasy, are substantiated in real life situations. (i.e. coitus in animals, observations of vaginal bleeding from menstruation and partuition). Again as mentioned above, the most easily discovered part of the female anatomy is the penile analogue, the clitoris. In time, if more and more attention becomes focused on it the path of development which leads to normal pleasureable vaginal activity and sensitivity is short-circuited by the double mechanism of the denial of the vaginal cavity and affirmation of the clitoris.

Knight states that the above state of affairs leads to further suppression of awareness of the presence of a vaginal cavity, and paves the way for traumatic comparisons with the penis, and anxieties about presumed past damage or feared future damage to her already inadequate genitalia. In connection with such distorted theories and anxieties, her relationships to other individuals also become distorted. Her first emotional attachment, like that of the boy is to her mother. However, unlike the male child, her first attachment is homosexual, not heterosexual. The girls libidinal orientation must shift from her mother to the males in the family, namely brothers or father, and then finally to males outside the original blood group. Because of any number of reasons the female child may not make this transition, and remained over-attached (fixated) to the mother. This feeling may also be augmented by feelings

of envy, fear, or even hate of boys and men. In later life she remains attached to other females (not necessarily overt homosexuality). Or the transition from female attachment may be partially accomplished, and the woman may enter into a marriage relationship for reasons of procreation. However, persistent childhood anxieties may remain with her, resulting in conflicts regarding sexual activity. These repressed fears combine with more active threats such as fears of defloration, pregnancy and child-birth to reinforce the notion that coitus is a damaging assault on the women by a cruel man. Frigidity, in one of its many forms is the result. Normal healthy women also go through the same historic development. However, their family situation allowed for relatively anxiety-free transference of emotional bias from the mother to the father, and then to males outside the family group. Any fears which they may have, have been sufficiently repressed so that they cannot be elicited by normal questioning or observation of outward behaviour. Only their disguised derivatives, the unconscious fantasies and hidden anxieties brought forth in dreams betray their presence.

Classification of Mental Mechanisms Underlying Sexual Maladjustment

There are many ways to classify the mechanisms involved in the production of frigidity. Rado and Bergler serve as interesting comparisons in terms of their approach to the same problem.

Rado's classification is based upon the flight-fight-partial adjustment theory of human behaviour.

A *Flight From Heterosexuality*

(all in this group are presumptively frigid)

1. Withdrawal into chastity, failure to attract men, avoidence of suitors and narcissitic self-sufficiency.

2. Masculine identification: old-maidism, competition with men, espousal of causes involving women's rights.

3. Homosexuality: women engaged in lesbian practices—revulsion to all men.

B *Combat: Aggressive Battling with Heterosexual Objects* (group actually frigid)

1. Marriage with female dominance; constant berating and down-grading of husband.

2. Finanical exploitation.

3. Prostitution: degradation and infection of men, with only pecuniary interests in sex.

4. Nymphomania: aggressive pursuing of men with seduction, a constant quest for sexual fulfillment which is never obtained.

C *Partial Adjustment* (fairly good outward appearance, sex becomes sublimated in favour of other aims.)

1. Marriage characterized by resignation, suffering, and martyrdom.

2. Household obsession with cleaning, decorating, etc.

3. Inhibition and prudishness; sexual pleasure is sinful.

4. Glorification of motherhood; numerous children conceived with indifference.

5. Aggressive pursuit of a career.

6. Refusal to assume any obligations; card-playing, travelling, etc.

The above group is relatively frigid, and sexually responsive only on rare occasions.

Bergler's classification deals more with Freudian psychodynamics, and he postulates three main categories.

1. *Physical causes*

   a) Systemic: i.e. advanced T.B., cancer, heart disease with shortness of breath, kidney disease with uremia, malnutrition, chronic fatigue due to anemia, chronic alcholism etc.

   b) Local: usually presents through the symptom of dyspareunia. i.e. unyielding hymen, urethritis, cervicitis, P.I.D., congenital abnormalities, displacement of organs.

2. *Concomitant of Other Mental Conditions*

Frigidity is only one of the aspects of the total morbid psychiatric picture. This symptom may be part of the hysterical personality, with conversion hysteria phenomenon. It may represent an anxiety neurosis, endogenous depression, or it may be an early sign of serious mental illness. i.e. G.P.I. or other organic psychoses; schizophrenia.

3. *Psychogenic Disturbances*

Bergler lists as many as fifteen psychodynamic types. Only several will be mentioned here and briefly discussed.

a) Oedipus Fixation
   This is a hysterical conversion reaction, based on the remnants of oedipus and castration complexes. This state is unconscious since the original love for the father has been repressed. Hysterical women are without exception frigid. They are unconsciously trying to keep a balance between the wish for a father as a love object, and the desire for punishment, because of the guilt which is felt for the prohibited wish. These women may be found in severe cases looking after their father and leading not unhappy lives. But married life is ambivalent and tragic. The female may also be fixated on her mother, and the disorder becomes the frigidity of latent homosexuality.

b) Oedipus Complex plus Castration Complex (revenge)
   Two outstanding tendencies:
   1. to seek revenge against men
   2. to acquire a penis by force.

These women are often filled with rage and aggression toward men. They exhibit a number of variable traits. They often champion men who are sick, or have some physical impairment, like an amputation. Other aggressive frigid women chose the passive effeminate type of husband whom they can dominate. These type of women may even show immoderate sexual desire, wearing out the male with no gratification for herself. Or she may contempuously reject the sexual act with inappropriate remarks . . . "have you really finished?" She displays no vestige of tenderness, before, during or after intercourse.

c) Vaginismus

This is the unconscious desire not only to prevent penetration, but also to hold on to the penis. The muscle spasm represents the repressed desire to castrate the male and to reject the sexual role of the female.

d) Frigidity with Masochistic Mechanisms

The female identifies with her mother, and sex is looked upon as a cruel sadistic act. This fear can become secondarily sexualized and enjoyed in the imagination as a masochistic pleasure. The pleasureable element of sexuality remains only the anxiety or the erotization of fear. Intensive repression of masochistic instincts, namely the normal passive, receptive role of the female leads to narcissistic fear of defloration.

e) Frigidity with Ascetic, Anti-sexual Ideology

This type of frigidity is bound up with the struggle to compete on an equal basis with men in modern day society. Frigidity gives the female an added advantage. To obtain orgasm is to be conquered. Or in yet another instance, the women may love her husband dearly, and maintains the pose of being interested only in spiritual love. She withholds sexual favors from her 'beloved' husband, because sex is unclean, and this would contaminate the relationship. However, she may indulge in illicit affairs, and prostitute herself to a man whom she knows only casually. Her orgastic response will be intense and satisfying. In this case, the adventure of doing something dirty and immoral triggers the orgasm.

The above etiological classification ends the discussion on sexual frigidity. Prophylaxis and treatment will not be discussed at this time, since for the most part these topics are applicable to specific, individual cases, and general discussion would not prove productive.

Let us end up on a less psycho-pathological note. In Maslow's article "Love in Self Actualizing People" he discusses the healthy, attitude toward sex activity. "Sex very frequently becomes a kind of game, in which laughter is quite as common as panting. It is not the welfare of the species or the task of reproduction or the future development of mankind that attracts people to each other. The sex life of healthy people, in spite of the fact that it frequently reaches great peaks of ecstasy, is nevertheless compared to the games of children and puppies. It is cheerful, humerous and playful!"

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Abstract

Histoplasmosis

McCulloch, C.: Tr. Can. Ophth. Soc. 26: 107-125, 1963.

Certain types of granulomatous chorioretinitis appear to be caused by Histoplasma capsulatum even though the fungus has not been demonstrated culturally or pathologically in the eye. Nine clinical cases are described with evidence of systemic infection and showing the characteristic ocular signs. They show typical retinal lesions, paramacular lesions and those around the optic disc. The natural history of these ocular changes is described.

Reasons for accepting Histoplasmosis as the cause of these lesions are discussed and specific treatment with amphotericin B is advocated with avoidance of steroids in order to save sight, even in the absence of proof of the etiological agent.

M.T.

On Inspection

E. M. Sellers 6T5

Answers on page 220

1. This 46 year old, very short para o gravida o female has had primary amenorrhea all her life. At least three characteristic features which would explain her sterility and amenorrhea are demonstrated in Figure 1. What is the diagnosis and what other clinical features are there of this condition?

2. Upon admission this man's liver was noted to be firm, non-tender, and 3 fingers below the right costal margin. What clinical sign does Figure 2 illustrate? What explanation has been advanced to account for the occurrence of this lesion?

3. What bony lesions are associated with the *café au lait* pigmentation on this young girl's leg? What other clinical features are these of this syndrome? With what conditions could this patient's disease be confused?

The Sources of Our Love

G. S. Duckworth 6T5

"The man who does not know history is condemned to relive it" Santayana.

Love is a word to conjure with. Brave men have died for it, nations have warred for it, poets have praised it and saints have prayed for it. We have all been brought up to believe that imaginative literature and the fine arts must both of necessity be preoccupied with the subject of love. It is only when we turn to the works of an earlier age—Homer, Vergil, Boewulf, Roland — that we realize how unnatural such an obsession with love must have seemed to them. Likewise we assume that love is ennobling and, at the very least, the sole basis for marriage. We are shocked to learn how foreign is this idea to ancient thought. This essay is an attempt to trace the stages in men's attitudes to love in tho hope that some historical perspective will help to free us from excessive bondage to our own culture.

Death menaced early man at every turn. His problems were those of life and death, and all his activities centred around the effort to preserve himself and derivatively his tribe, in the face of a hostile universe. In this struggle woman performed certain necessary functions for which she was valued, not least of which was that of bearing children to assure the future of the tribe. Because she was assessed functionally, woman could be bought and sold for anything of equivalent survival value. But although woman was a piece of portable property, prolongued association could foster a relation of affection between herself and her owner. So Isaac was always fond of Rebekah, even though he had paid hard cash for her. Thus marriage in this early period was a purely social relationship conditioned by the needs for life and health and arranged by parents without the knowledge or consent of the partners involved. The man-woman relationship was primarily a utilitarian association with sex as a socially necessary activity.

The Greeks, originally similar in their attitude to the early Hebrews, soon began to feel themselves marked off from the surrounding welter of alien tribes by their "greater enlightenment, and emanicipation from silly nonsense." In short, by their emerging rationality. But the intellect soon became aware of an annoying distraction and a source of many false ideas and opinions—the flesh. This realization was sharpened by the impact of Eastern religions upon the Greek consciousness.

Buddha, mindful of the impermanence of the flesh and the sufferings and disorders which it occasioned, early decided that "successful high-mindedness seems to me incompatible with . . . attachment to sensory concerns . . . you will not prevail upon me to devote myself to ignoble sense pleasures." When a king asked his disciples whether they valued the body, they replied "Just as you, being wounded in battle, care for and attend to the wound, so we care for the body without being attached to it." The whole world of the senses came to be an illusion which the wise man forsook in his search for truth.

Influenced by Eastern thought, Orphic religion taught that the body was a prison or tomb for the soul. The Orphic stream flowed through the Pythagoreans to taint all Greek rationalism with a contempt for the flesh and its workings. Meanwhile woman, rendered partially useless by the emergence of slave classes trained in the household tasks which were formerly hers, lost even more status by her sheltered up-bringing which kept her uneducated and completely ignorant of events in society. It is not surprising that intelligent men, unwilling to squander their wit and education on illiterate females, shunned their society in favour of their social and intellectual equals—other men, or rarely a hetaera (a type of prostitute trained to be sexually and intellectually stimulating). So unpopular was marriage in sixth century B.C. Greece, that Solon considered passing a law making it compulsory.

The Greek male had a lively contempt of woman; and a thriving antifeminist literature sprang up berating woman for her numerous faults. "Marriage brings a man only two happy days", wrote Pallades, "the day he takes his bride to bed and the day he lays her in her grave." With this sort of background sex, as one could expect, was either looked on as a wilful wallowing in the muck or as an unhappy madness: "I was mad, a god touched me with madness" cried Euripides' Phaedra. Sophocles, on being asked whether he missed the sensual delight of his youth, retorted "Don't talk to me about that! It's like being freed from bondage to a raging madman."

Not being inhuman however, the Greeks had to have some emotional relationship with others. This relation took two forms: the first was an intellectually satisfying friendship with one's equals. The other was that curious affair, the homosexual cult of boy-love. The Greek seems to have responded to an adolescent boy much as modern man does to a young, intelligent and well-educated girl. Although it is clear that women, being illiterate, could not evoke either friendship or romance, the question remains—and is still unanswered—why the Greeks should have created this particular kind of relationship, as emotionally stirring as it was peculiar But fundamentally their attitude was to eschew fleshly

entanglements and pursue honour and wisdom. Love was not to be honoured, but to be ignored.

PLATO

What, however, did the greatest of Greek thinkers, Plato, say about love? It is difficult to understand the thoughts of this complex genius, accustomed to looking at life from diverse viewpoints. In the *Symposium*, we have a series of after-dinner speeches by various people, heaping praise upon the god of love. Finally it is Socrates' turn. Love, says Socrates, always has an object which it desires. Since one desires what one does not possess, love, desiring the beautiful and the good, cannot be either. This does not mean that it is ugly or bad but rather that it is between the two states. "Carrier and interpreter between men and gods, it brings human prayers and sacrifices to the latter, commandments and rewards to the former. Existing in the place between the two, it completes and binds the whole together by means of itself."

The gods and the wise do not love wisdom, for they possess it. Nor do the ignorant, for not knowing it exists, they believe themselves beautiful, wise and good. Being between these, Eros loves beauty and wisdom and strives to create it. Yet the creations of beauty differ greatly. The man of the flesh loves the body and creates children, but the man of the soul loves beauty and wisdom and creates ideas, laws and poems, offspring more beautiful and more immortal.

"A man who approaches this matter in the right way must begin in youth by frequenting beautiful bodies and, if he is guided aright, he will first love one such body and hence produce beautiful thoughts. Then he will perceive that the beauty of one body is akin to that of another, and if he must pursue physical beauty it is very absurd not to consider all physical beauty to be one and the same. Realizing this he will be the lover of all beautiful bodies and he will relax his passion for a particular one and despise it as something small. Next he will consider beauty of soul to be more worthy than beauty of body so that if any one with a fair soul have but small physical grace, it will suffice; he will love and cherish such a one and seek to utter such thoughts as make young men better; that he may further be forced to contemplate the beauty of laws and traditions and see that this is all of one kin. He will then consider beauty of body a small thing. From traditions he will be guided to the sciences, that he may see the beauty of these, gazing upon much beauty and no longer on that of one thing like a slave who loves the beauty of his boy or of some one man or one institution, an inferior feature of little worth. Not so, but turning to the vast sea of beauty and gazing upon it he will utter thoughts both proud and beautiful in the abundance of his love of wisdom until he gathers strength there and power to look upon one such science, which is the knowledge of beauty such as this. The man who has been guided thus far in the mysteries of love, and who has directed his thoughts towards examples of beauty in due and orderly succession, will suddenly have revealed to him as he approaches the end of his initiation a beauty whose nature is marvellous indeed, the final goal of all his previous efforts. This beauty is first of all eternal; it neither comes into being nor passes away, neither waxes nor wanes: he will see it as absolute, existing alone with itself, unique, eternal, and all other beautful things as partaking of it, yet in such a manner that, while they come into being and pass away, it neither undergoes any increase or diminution nor suffers any change."

So in the final vision of beauty itself, the lover loses himself and the love of all particular beauties. The love of another person is the rung of a ladder which must be left behind if we are to arrive at the pure love of Ideas.

Yet in the *Phaedrus*, we get a different impression of human love. Here Socrates castigates the physical and possessive lovers who "act under compulsion . . . chained by passion as by a disease . . ." but then goes on to tell how the soul, shaped and winged in eternity, homelessly walks the earth until suddenly its eyes are infected with the beauty of another person and rooted to the gaze, trembling with unknown feelings, the soul strains at its bonds and sprouts new wings. The beloved, astonished at the divinity of this love surpassing all others he has known, feels his own soul quicken and stir until both in harmony fly to the limits of the known and gaze enamoured at the uncreated Ideas from which they sprang. This passage, taken together with Plato's casual suggestion (*Laws*) that by forbidding homosexuality and practising moderation in conjugal sex "men will be friends to their wives," seems to be the birth-cry of romantic love.

But the bonds of society were too strong for Plato. Knowing that the revolutionary suggestion that women could be friends on an equal footing with men would be branded as "unrealistic" and thrown out of court, he provides a "second-best law" whereby all intercourse is branded as shameful in the interests of men's higher selves. This, he knew, had far more chance of being accepted than a quixotic ideal based on some mythical idea of the equality of women. We see then, that in Plato also we find the Greek tendency to stigmatize sex as being excessively "physical" and to fly by the intellect from the love of the particular to that of the general, from mortal man to the boundless ocean of reality, in which the questing soul finally loses itself.

Yet Plato's description of love is unique. For the first time we see the sources of love—the immortal longings of man's higher soul, the eternal truths towards which Eros impels man. We see the unhappy mind rising on the wings of love to contemplate the true nature of things, passing through the baser to the purer loves until it finally catches a vision of the uncreated ideas and rests forever in the knowledge of things as they essentially *are*. So Eros is the road the thinker must tread in order to reach true knowledge. The man who

does this is wise indeed—he is the true "philosopher in love."

To the Greeks, cognitive activity consisted in the flight from the personal to the impersonal, from the particular to the general, from the given to the concept. Christianity, however, demanded a *personal* relation of man to the ground of the world conceived of as a supreme personality, and it expresses this demand in the thought of the divine sonship of man. Therefore, it is the essential feature of the Christian world-view that it regards the person and the relations of one person to another as the essence of reality. This truth it expressed as "The rational structure of the world (Logos) became flesh and dwelt among us" (John 1). The peculiar cognitive attitude enjoined by Christianity was not, as with the Greeks, detached rationality, but commitment to the inter-penetration of the knower and the known. Not thought, but love. "God is love, and he that loves is born of God" (1 John 4:7).

With Christianity, we pass from the general to the particular, from the concept to the event, from thought to love. It is not surprising, therefore, that Christianity should always have cherished the love between husband and wife, and defended the goodness of God's creation —including the body and its sexual aspects. "Where flesh is one, one also is the spirit" writes Tertullian (ca. 200), "Together husband and wife pray, together fast, mutually teaching, exhorting, sustaining. Equally they are found in the church of God, equally at the banquet of God, equally in persecutions and in refreshments." But the high Christian ideal of married love was not to go unchallenged.

Drawing its sources from Greek thought, Neo-Platonism derived the world from Being, identified with light, spirit and creativity, and Non-being, which was privation, evil, matter. Simultaneously the Gnostics, inspired by Oriental religion, taught than an ineffable Creator, pure Spirit, had emanated less pure beings until one arose foolish enough to create the world of matter. Matter was Sin and Illusion, and the wise man freed himself from contamination with matter to achieve perfect union with the One pure spirit. Sex and the flesh were despised, and virginity and meditation were exalted. So began the strong hold of this dualistic spiritualism upon western history.

COURTLY LOVE

Human attitudes to basic problems rarely change—there have been only a few such instances in all history. One of the most remarkable of these reversals of thought-current occurred with startling suddenness in the twelfth century in Southern France. Into a world saturated with literature condemning fleshly entanglements, there began to pour a spate of love poetry extolling the power of passionate love for a woman. Troubadour poetry was characterized by Humility, Courtesy, Adultery and the Religion of Love. The lover was always object. No matter how cruel or how arbitrary seemed to him the desires of his Lady, he was her servant and must obey. The lover was a breath of air, but the Lady was the breath of God. "Each day I grow better and am purified, for I serve and reverence the most suave lady in the world." The Lady was addressed as "midons", my Lord, and the lover was her vassal over which she had complete rights, and who had to perform the most arduous services at her behest. The process has not unjustly been characterized as "the feudalization of love." But the laws of Courtly Love were more binding on the lover than those of society, and it was a cardinal sin against Amor if the lover even hesitated at the breach of Feudal laws . . . Thus Guinevere ostracized Lancelot because he hesitated before letting himself be driven in a cart of shame for her. He did not so hesitate when it came to seducing her.

The extravagant obsequies which the lover performed were not, however, regarded as degrading, but ennobling since they were performed in the name of Love. "It is agreed among all men that there is no good thing in the world, and no courtesy, which is not derived from love as from its fountain." Not only was it ennobling, but Courtly Love was the only source of salvation for unhappy man; "By her alone shall I be saved." What they were in fact proclaiming, were the laws of the religion of Love, of which the first was adultery. Marriage in the Middle Ages was a social arrangement felt to be the union of lands and properties with the wife as the object of barter. Hence it followed that the man who served Love could not love his wife. "We declare and establish that love cannot extend his power between husband and wife." The lady of his dreams was instead of a high social standing, preferably far above his own; she was beautiful and noble —and wholly unattainable. "No joy is so pleasing to me as the possession of that distant love." But the possession of the Lady physically, though pleaded for by the lover, was not actually desired by him. "It is no longer courtly love if it is materialized or if the Lady yields as reward" wrote Daude. The man who desired coitus was a churl who did not understand courtliness. Why should this be? What deep-buried reward did the lover seek which was not to be found in the body of his Lady? Let us for answer turn to the greatest of the myths of Courtly Love, that of Tristan and Isolde.

Tristan, nephew of King Mark of Cornwall, goes to Ireland to bring a bride, Isolde, the daughter of the King of Ireland, for his uncle. On the way back both accidentally drink a love-potion intended for King Mark, and fall passionately in love. "Languishing passion, longing and growing, love ever yearning. . . ." This passion is omnivorous, eternal, demanding its own opposition. When they sleep together Tristan lays his sword between them so that they cannot have fruition. Bound by feudal loyalties, the hero becomes her lover in all but sex. They lie in each others arms, dreading the advent of day which dispels their beloved night-

dreams: Isolde—"But the Day must dawn and rouse thee?" Tristan—"Let the Day to Death surrender . . . O might we [illegible]ien together die, each the other's own for aye! Ne'er fearing, never waking . . . O night of rapture, rest upon us! Lift our lives' remembrance from us, let us but abide with thee; from the world, oh, set us free! Extinguished in the twilight's streaming . . . from the world release us . . . ne'er daunted by daylight's beam be our undying dream."

We have come upon something totally foreign to the systole and diastole of sexual love, something insatiably yearning, infinite, night-loving. This passion seeks a union impossible on earth, a love for which the precondition is death: "deep, eternal, all forgetting! . . . this terrible yearning wasting my heart; if I could name it, if thou couldst know it!" But the lovers are betrayed: King Mark and the traitor Melot burst in on them, swords drawn.

Tristan turns to Isolde: "Where Tristan now is going, wilt thou Isolde follow? The land where Tristan means . . . it is the dark abode of night from whence I first came forth to light. . . ." So saying, he runs upon his adversary's sword and receives a mortal wound. What can it mean, this desire for languishing, "yearning and dying?" Why is the Religion of Love also the worship of Death?

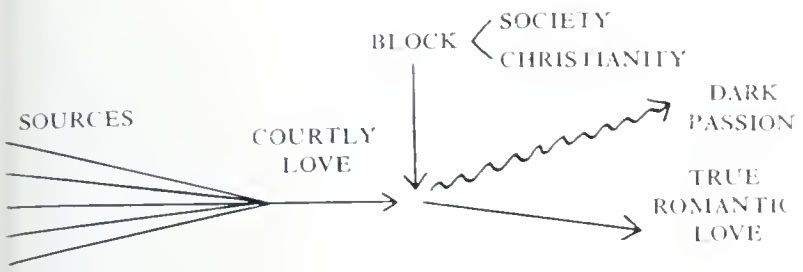
The sources of Courtly Love are hazed in mystery and lost in time. Many streamlets flowed together to form, centuries later and in Provence, the river of Courtly Love. Plato, as we have seen, taught that the soul passes from the love of particular beauties to that of beauty-itself. One popularized and degraded form of Platonism held that in physical beauty a man could find his fulfilment. It therefore propagated a sensual cult of sex-worship, later to be utilized by the religion of Love. Meanwhile, around the 6th century in India, there arose a cult of erotic mysticism centred around the worship of the cosmic feminine principle which, through meditation, gave the worshipper the power to achieve complete and final fusion with the secret force animating the cosmos. As a training for the final Nirvanic union, the followers of this cult practised the service of a high-born woman, progressing by specified phases to reach a union which was not complete, but in which "seminal stoppage" occurred. The purpose of this training was to achieve, not sexual union, but final unity with the cosmic powers in "supremely great happiness . . . the joy of annihilation of the self." This cult, passing through Persia, Arabia and Bulgaria, went in to the making of Courtly Love and impressed upon it the characteristics of eternal longings, eroticism combined with chastity, and self-abnegation culminating in joyful self-annihilation.

Meanwhile, the Celtic religion of the West was preaching the fatal struggle of Good and Evil, Light and Darkness. Woman, to the druids, was a being both divine and prophetic symbolizing the other world and making us yearn, through the sexual attraction, in nostalgia for the eternal realm of Light in which our origins lie. Thus the desire for woman comes to possess an irreversible elevation, an insatiable longing which only Death, the unspoken centre around which the druidic teachings were woven, could satisfy. The Druidic cults were a fertile soil for the growth of various Manichaean sects, all of which taught that the soul was divine but entombed to its everlasting sorrow in the flesh: "I came out of light and the gods. Here in exile am I from them kept apart." So the Celtic hero, returning from heaven to earth recalled the immortal isle; but his desires were checked by jealous Venus who sought to imprison him in dark matter by using sex as her bait. The sin of birth was the supreme woe to be cured only by the deliverance of death. Thus developed the hatred of sexual fruition, the longing for union with the other world through death, and the cult of woman as an inspired being, a seeress, a sprite.

Arabian philosophy began in the Middle Ages to develop the notion that the animal soul could be guided upward towards God by the rational soul in the sublimation of the desire for the beauty of women. Arabian mysticism, couching its language in somewhat similar terms, propagated the cult of the mysterious Lady of Thought through which man was brought to God. "She" was a lovely Lady who, appearing to the dreamer, says "I am thyself." She was, in fact, the lover's *true* self, the anima in every animus. From her came alike salvation and death: "The repose of love is a weariness; its onset, a sickness; its end, death. For me, however, death through love is life: I give thanks to my Belovèd that she has held it out to me." "To die is to live and to live is but to die." The Arabian erotico-mystical cult, pushing through Spain, leaped over the Pyrenees into Southern France where, fusing with the other streams we have traced, it tongued the poetry of Courtly Love with that fire which still consumes the hearts of men.

Courtly Love was not, however, allowed to flow unalloyed through the ages to the present, but from the moment of its inception it received bitter opposition from two sources. The first of these was society which, unable to tolerate the casual disregard of the social ties preached by the troubadours and suspicious of the impact of the Religion of Death-Love upon members of society, tried to suppress it. Far more bitter was the opposition of the Church to the heresy of Courtly Love. It tried by every means at its disposal, from invective to excommunication, to turn men against it. The Church was not, however, to escape the influence of Courtly Love, for from this time date the cult of Mary and the Epithalamion mysticism of the West. The Church's opposition was also weakened by the Manichaean condemnation of the flesh which it had picked up around the third century A.D. and which constituted an uneasy bedfellow for the specifically Christian love of God's creation. Combined with society's love of order, however, the Church was a block powerful enough to drive

Courtly Love underground and to split it forever into two streams. We can illustrate the process thus:



The stream of "Dark Passion" in turn has not remained pure, but has suffered a series of mutations and degradations too complex for me to trace, but which are all characterized by varying degrees of unawareness of the mystical depths of Courtly Love. Thus the songs of the troubadours, taken as representing carnal desire for particular women, gave rise to many glorifications of sex culminating in the endless sensuality of Don Juan. At the other extreme we have the cult of "the Dark gods in the blood" of which a fairly recent outgrowth is the cult of orgasm equated with death (c.f. *Fanny Hill*, recently popularized, c.f. DH Lawrence). On the more popular level we find the tragic element of the Religion of Love diffused into mediocrity by the desire to "have it all cheaply." Modern mass man, unwilling to pay the fatal price for romance, is content to have it "at bargain-basement prices" by dreaming about it endlessly in a vague yearning for exotic adventures and affluent surroundings (e.g. the "Saint" series of books). Or else he reads about "the eternal triangle" or joins the Hollywood cult of Aphrodite. The progeny of Courtly Love oscillate between a sensuality which despairingly tries to solve all human problems by immersion in the mindless oblivion of the natural processes (alcohol with Dylan Thomas, sex with Don Juan) and a fiercely proud worship of dark passion which tries to rise on harmonal wings to reach universal significance—"the loud lament of the disconsolate chimera."

What of the stream of "true romance?" Men have traditionally held three opinions of the flesh. The first, that of Eastern religion that it is a wound of the spirit. The second, that of the Judao-Christian heritage, that is the temple of God. The third, by far the most usable of the three, that of St. Francis, that it is a lovable buffoon "Brother Donkey." Unlike every known religion, all of which strive to "sublimate" man by condemning his finite life, Christianity preaches the new life *here below*, in a "working-partnership" with God who loves us in our particularity. Christianity brings forth not "the eternal feminine," but "the neighbour" who is to be loved in his or her full concreteness as a unique being. While Tristan said of Isolde "If she loves me, it is by the poison which holds me from leaving her and her from leaving me" and Isolde of Tristan "Lord, by almighty God, he loves me not, nor I him: except for a herb potion which I drank and which he drank; it was a sin". Christianity preaches the scandal of particularity and rejoices in the flesh. "The Word became Flesh and dwelt among us . . ." "Matter, eldest of things, would fain/ Be limited by flesh and born again." Based as it is squarely upon the love of the concrete individual, Christianity lays the foundation for a view of marriage based on love. The intellectuals of the Church were often astoundingly slow to build on this foundation. With the prevalence of the "anti-flesh" viewpoint, priests tended more to maintain that the flesh was not evil rather than to say that it was a positive good.

The first recorded instance in which "marriage for love" was advocated, was in the Parzifal of Wolfram of Eschenbach (after 1170). "Invited now to share one bed, he and the queen said they would wed." Dante, writing after 1284, was the first to be theologically serious about love. In his works, the youthful *New Life* and the magnificent *Comedy*, we have the most beautiful and complex love-poems ever written. In the *Comedy* Dante proclaimed how he was saved from Hell by the love of Beatrice and how in her eyes he saw God himself shine forth. Almost banned at the time of writing, his works have justified lovers for all time to come.

Christine of Pisa (1364-1429) rebelling against the denigration of woman in current literature, wrote a series of poems justifying her sex. In one of them she celebrated the love her husband felt for her: ". . . He said that this was what he dreamed, (As I with proof can tell) 'An angel raised me up it seemed/ From some obscuring hell/ To be your servitor, Ma Mie, / To serve you in humility.' Truly, he loves me well." Her poetry aroused a storm of antifeminist literature denying that marriage could bring love or bliss. England had to wait for Spenser (1522-1599) to proclaim love as the basis for marriage. In a poem on his own wedding Spenser writes "Tell me, ye merchants daughters, did ye see/ So fayre a creature in your towne before . . . /Had ye once seene these her celestial treasures/ And unrevealed pleasure,/ Then would ye wonder and her prayses sing,/ That all the woods should answer, and your echo ring."

One of the greatest popularizing forces for the "love in marriage" concept, was Martin Luther, an ex-monk who married an ex-nun. ". . . above them all is married love, that is, a bride's love. It burns as fire, and seeks nothing more than the mate. It says, "I wish not yours, I wish neither gold nor silver, neither this nor that. I want everything or nothing." All other loves seek something else than that which is love, but this love alone desires the beloved completely." "Ah, dear God, marriage is not a thing of nature but a gift of God, the sweetest, the dearest, and the purest life above all celibacy and all singleness, when it turns out well, though the very devil if it does not." Through his influence many of the Protestant sects came to preach the virtues of wedded love, and the value of the family. That great

Anglican, Thomas Hooker, wrote lyrically about marriage:

"The man whose heart is endeared to the woman he loves, he dreams of her in the night, hath her in his eye and apprehension when he awakes, museth on her as he sits at table, walks with her when he travels and parlies with her in each place when he comes . . .

That the husband tenders his spouse with an endeared affection above all mortal creatures; This appears by the expressions of his respect, that all he hath, is at her command, all he can do, is wholly improved for her content and comfort, she lies in his bosom and his heart trusts in her, which forceth all to confess, that the stream of his affection, like a mighty current, runs with full tide and strength . . ."

The love letters of the Quakers were full of ardour. William Penn, writing to his wife, called her . . . "the most beloved, as well as the most worthy of all my earthly comforts" . . . Ann Audland, writing to her husband, absent on a mission said "Dear heart, in life dwell, there am I with thee out of all time, out of all worlds, in the pure power of the Lord; there is my joy and strength . . . Oh, it is past my utterance to express the joy I have for thee, I am full, I am full of love towards thee, never such love as this . . ."

Puritan ministers got hot under their hat-brims when they talked about the " Popish conceit of the excellency of virginity." They stressed the emotional harmony between man and wife, and constantly urged spouses to be completely attuned to each other. Listen to this fragment from a Puritan sermon delivered in 1620:

"As there is no affection more forcible (than love), so there is none freer from force and compulsion. The very offer of enforcement turneth it oft into hatred . . . even a natural man's dim eye may easily see and discern a more special providence of God oft carrying things in these cases."

Pick up one of their tracts on marriage, and you read "Husbands and wives should be as two sweet friends, bred under one constellation, tempered by an influence from heaven, whereof neither can give any great reason save that mercy and providence first made them so, and then made their match." Pastor Rogers declared that "marriage love" is a "sweet compound" of spiritual effection and carnal attraction, and that the blend of the two is the "vital spirit and heart blood" of wedlock. Milton sang with great beauty his love for his wife. His poem "Methought I saw my late espoused saint . . ." describes movingly his senses of loss when she died: "But oh, as to embrace me she inclined, I waked, she fled, and day brought back my night." Turn to *Paradise Lost* again and read about the love of Adam and Eve ". . . For contemplation he and valour formed,/ For softness she and sweet attractive grace . . . / Into their inmost bower handed they went . . . / Hail wedded love, mysterious law, true source of human offspring, sole propriety/ In paradise of all things common else! / By these adulterous lust was driven from men . . ."

The modern man stands exposed to all the extremes of the love doctrine. On the one hand he hears Carmen's siren song "Love's a gypsy through and through . . . if I love you that's the end of you!" luring him to social destruction and death; on the other, Violetta singing to the image of her husband-to-be of "a love that throbs like the heart of all nature . . . high as heaven above, exquisite rapture . . ." He hears the Sagos who say "Love? Tut! 'tis but a lust of the blood and a permission of the will" and he hears the radio blaring that "Love is a many-splendoured thing." Which is he to believe: that love is a hormonal accident, that it is a dark god seizing one with unwilled rapture, or that it is a many-splendoured bliss? The answer cannot be given in terms of the superficialities of sociological comparison, but demands an analysis of the nature of man and the rôle love plays in the totality of human experience.

LOVE IN DEPTH

The "I-Other" relation is the basic structure of reality. The human being, insofar as he is human, stands outside the natural course of the world in full consciousness of its alienness and of his own selfhood. In fact the more fully human a person is, the more individuated and cogent the "I" becomes, the further it stands from the world of the natural processes. Standing out of the life-process it participates in, the human self grows away from the "other" in the loneliness of its own awareness that it is unique and like no other. But its very isolation drives the self to relate itself to the world, for without the world the self lacks content; without the self, the world is dead.

So the self enters the quest for knowledge of the "other". The path it treads is that of the cognitive glance at the subhuman world, directed from the full height of its selfhood and therefore conditioned by its own active energy. This is the Greek concept of knowledge, which produced as the fruits of detached reason both science and friendship. However, when the I turns its cognitive regard upon another, the other returns its glance and the self stands against the self as equal to equal, as agent to agent. The questing I must therefore assume a double role—both knower and known, both agent and acted-upon. This interrelationship, based on the full confrontation of transcendent self to self, is love.

The "loving" constellation is based upon Kant's famous principle that we must never use people as means to an end, but always consider them ends in themselves, i.e. that we cannot objectify them but must encounter them with the same respect we turn upon our own selves. To restate the case, the ideal man is a sphere in which all his energies turn harmoniously

around one common centre, the ground of all Being (God). To be in love with another means that your spheres of existence interpenetrate successively until in the moment of ecstasy, of standing outside yourselves, the two centres fuse with an upflaming which pierces the depths of existence to reach their infinite core. "It is a thing enclosed under secretnesse of privyte, why twey persones entremellen hertes after a sight." "O there is a melody in heaven which the poets call Harmony . . . Sweetness of this paradise has ravished you; it seemed you slept, rested from all other diseases: so kindly is your heart therein grounded."* This is the moment where eternity shines through the eyes of your beloved to infect your own with its beauty.

But this golden moment cannot be worn daily as a coat, for the gold of eros does not wear well. Marriage, courtly love to the contrary, cannot be based solely upon this transcendent, intensive fusion of man and woman, but must weave a tapestry wherein the strands are the daily trivia, shared in mutual affection and respect. Against this plain cloth eros can throw its magic gold that transforms the whole by the intersection of the timeless moment with time. Love is thus seen as the answer to the problem of man's loneliness, the medium in which God is worshipped and man is understood. Only in the loving constellation is man fully human.

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Book Review

HANDBOOK OF OBSTETRICS & GYNECOLOGY

Ralph C. Benson. 656 pp. Illust. Lange Medical Publications, Los Altos, Calif., 1964. $5.00 paperbound.

This is the latest of the Lange series of handbooks for medical practitioners and students. Like the other members of this series the handbook is intended to provide an abbreviated but reasonably comprehensive companion to the larger "standard" textbooks. The author has accomplished his purpose rather well but in the attempt to provide a compact review he has, in many cases, neglected the theoretical concepts which enable the student to understand the condition with respect to its pathogenesis and clinical presentation. This is especially true in the sections dealing with the course and conduct of normal labour and delivery.

The volume is divided into two sections: one on obstetrics and the other on gynecology. The first 36 pages of the book are devoted to a brief but well written review of the anatomy and physiology of the female reproductive system. The remainder of the section on obstetrics covers all the major topics but emphasizes the clinical management of these conditions, and in the chapter which deals with forceps he engages in a discussion on the technique of forceps operations which is of interest to the practitioner but of little interest to most students. The chapter dealing with abortion could well be expanded.

The section on gynecology is fairly complete and the final four chapters which deal with the difficult diagnostic problems in gynecology are worth-while additions.

However, in spite of its conciseness, it is not easy reading and a greater use of tabulations might improve its comprehension. While the treatment of some disorders varies slightly from that practised in this centre, the difference is not enough to be significant but may cause some confusion in the minds of unwary students.

In summary, this book will not replace the larger, more expensive, texts but for the student who is unwilling to spend the large sums of money for these texts, the handbook is highly recommended.

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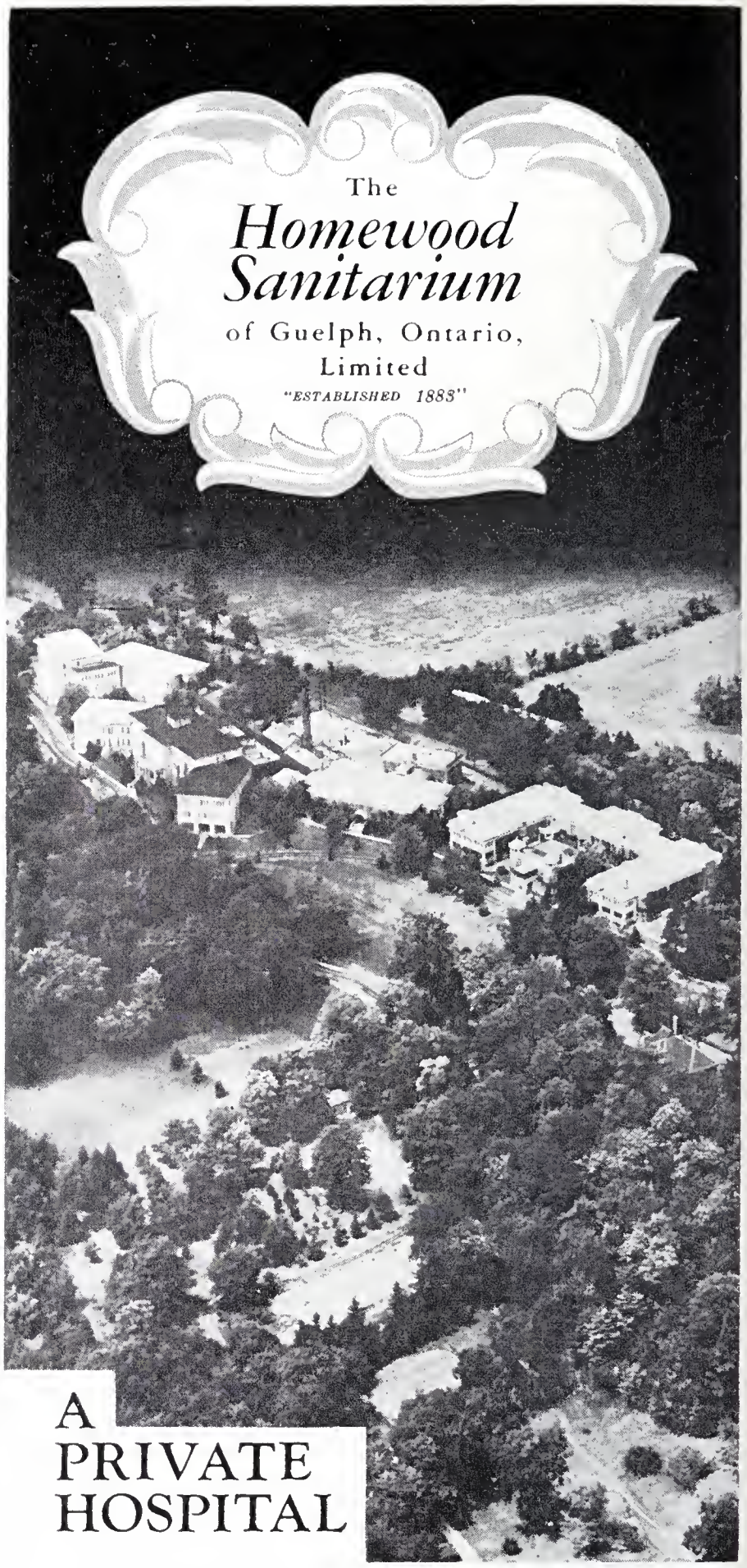

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*Sleep and Dreaming**

INTRODUCTION

Of all the vital functions of man, sleep is the most urgent: man can go a lifetime without sex, weeks without food, days without water, but the length of the waking state before sleep intervenes is measured in hours. If man is derived of sleep, sustained mental and muscular activity is impossible, sensitivity to pain increases, the disposition becomes impaired, and there is a tendency to hallucinations and other maanifestations of a psychotic character.[1] Animals have been reported to die from sleep deprivation. Thus sleep is of paramount importance, yet throughout the ages it remained a mystery that tantalized and puzzled the mind of man. Only in relatively recent times has it been scientifically investigated, and as yet only certain of our questions have been answered: What causes the alternation of sleep and wakefulness? What differeences characterize the sleeping and waking states? What are the course of events during the sleep phase? These are the questions that this paper shall attempt to answer.

Part I: The Nature of Sleep

L. E. Cappe 6T5

Over the years many theories have been proposed to account for the alternation of sleep and wakefulness. The current concept, based on considerable experimental data, explains the alternation of sleep and wakefulness by the activity of the brain stem reticular formation. The reticular formation extends within the central core of the brain stem from the medulla, through the tegmentum of the midbrain to the dorsal hypothalamus, epithalamus, subthalamus and thalamus, being made up of diffuse groupings of different types of cells with numerous fibres coursing in all directions.[2] Ascending impulses from the rostral part of the rectular formation have an activating influence on the cerebral cortex during wakefulness; in natural sleep the ascending facilitation is diminished, with consequent diminution of the responsiveness and working efficiency of the cortex. It is the lower brain stem reticular formation that exerts a damping effect on the upper reticular formation, tending to bring about sleep.

In animal experiments it was found that afferent impulses from the baroreceptors of the carotid sinus and aortic arch have a damping effect on the upper reticular formation and bring about EEG changes characteristic of sleep.[3,4] In humans too, fluctuations of awareness of faint stimuli were found to synchronize with fluctuations of both heart rate and vasomotor tone. It is known that a brisk shower of baroreceptor impulses passes to the midbrain with each arterial pulse, and it is possible for cerebral vigilance to fluctuate rhythmically at rates comparable to that of the pulse.

Experimentally it was found that a decrease of blood oxygen content stimulates the chemoreceptors of the carotid body, and the discharge from the latter stimulates the midbrain reticular formation. An increase of blood CO_2 or of acid metabolites stimulates the midbrain reticular formation by direct action.[5] This correlates well with the clinical finding that cerebral vigilance can fluctuate with the respiratory cycle, the end of inspiration being the moment of minimal awareness.

In animal experiments it was found that stimulation of certain areas of the cerebral cortex at times when the animal had fallen into a natural sleep caused awakening. The deeper the sleep, the stronger the stimulus needed. A relaxed but waking animal would become extremely alert.[6] Thus the cortex was capable of stimulating the upper reticular formation. However a negative feed-back also occurred i.e. descending impulses from the cortex could damp down the reticular formation and thus maintain an equilibrium. In humans a similar situation prevails. In one experiment[7] a tape recorder played a series of hundreds of personal names which were spoken in a clear, urgent voice. Each subject was asked to awaken to his own name and to one other chosen name. Since the subjects were able to do so and since the auditory cortex is necessary for discrimination between complex auditory stimuli, it follows that it was cortical impulses that excited the reticular formation and so caused either partial or full arousal. That other cortical impulses are capable of damping the reticular formation, so tending to promote sleep, is suggested by those cases when a sleep state results from overwhelming or terrifying stimulation. Similarly, cortifugal impulses acting on the reticular formation can decrease the awareness of and responsiveness ot external stimuli.

CONCOMITANTS OF SLEEP

Various functional differences between sleep and wakefulness have been discovered.

* **Excerpt from a paper presented to the Alpha Omega Alpha Honour Medical Society.**

Muscular relaxation is a notable concomitant of sleep, in itself [illegible]ing to decreased metabolic activity and to recovery from muscular fatigue.

The action potentials of various skeletal muscles has been recorded in normal persons and in deaf-mutes during sleep and wakefulness.[8] There was a progressive diminution of action potentials during sleep in both deaf and hearing subjects, but more so in the deaf. However, even in the deaf, a complete absence of muscular activity was rare.

By the use of myography to measure stretch resistance, it has been shown that in a patient with a total transection of the spinal cord the spasticity of the legs was decreased during sleep.[9] Another observer noted that "the slow tremor of basal ganglion disease disappears during sleep."[10]

The closed eyelids are one of the most characteristic signs of sleep, although this is not necessarily so. Healthy children and, even more commonly, dehydrated sick adults or children often sleep with their eyes half-open and pupils partially exposed. The pupils are constricted during sleep; this has been ascribed to an inherent tonus of the third nerve, to be looked upon as a release phenomenon.[11]

Changes in the nervous system during sleep have also been extensively studied. The tendon reflexes, commonly represented by the knee jerk, either disappear or are greatly diminished during sleep.[12] The pupillary reflex is preserved in sleep, as a rule. Although the pupil is small, it can be made smaller by shining a light into the eyes after gently spreading the eyelids apart. The pupillary reflex time is lengthened, often by several seconds.[13]

One of the most characteristic phenomena that appears in healthy adults only during sleep is the positive Babinski sign. This sleep reflex was described in 1880, sixteen years before Babinski discovered its significance. A person must be deeply asleep before dorsiflexion of the big toe can be obtained through stroking the sole of the foot. When elicitable, it can be evoked any number of times provided a suitable interval (20 seconds) is allowed to elapse between stimulations.

It has been found that palmar sweating, an index of mental stress, decreased during sleep and recovers after awakening. This is paralleled by an increased palmar electrical skin resistance during sleep. Furthermore, persons in whom sleep produced a great increase in E.S.R. slept soundly and were hard to awaken; the opposite was true of individuals with only small rises in E.S.R.[14]

Dement proposed a classification of the EEG (Fig. 2) into stages one to four of increasing sleep depth.[15] In stage one, the alpha rhythm (a rhythm of wakefulness having a frequency of about 10 cps.) is lost, the amplitude of the waves decreases and the rhythm slows to 4 - 6 cps.

Stage two is one of medium depth sleep: the waves become irregular and slower in frequency and their voltage increases. This stage is characterized by the appearance of 'sleep spindles' — short bursts of waves that progressively increase and decrease in amplitude and have a frequency of 14 - 16 cps.

In stage three spindle activity is still present and is superimposed on a background of waves which are slower and of higher voltage than in stage two.

Stage four is the stage of deepest sleep, when the record is dominated by high voltage slow waves of 0.5 - 1 cps.

During a typical night of sleep, the depth of sleep fluctuates on a cycle lasting roughly 90 minutes (Fig. 1). The EEG pattern passes from stage one through stage four, then swings back to stage one. During later cycles, the sleep may not be so deep — the EEG pattern may dip no farther than the intermediate stages before it returns to stage one.

It has been found that dreaming occurs during the stage one EEG, but not when this brain wave pattern first appears at the onset of sleep. Only when the cycle returns to the stage one EEG from a deeper EEG level does it mark a dreaming episode. During this "emergent" stage one, it is much more difficult to awaken the sleeper than during the "initial" stage one EEG.

It should be emphasized at this time that the EEG should not be used as the absolute criterion in distinguishing between sleep and wakefulness. Experimentally, EEG sleep patterns have been recorded in dogs after injections of atropine, and yet the animals were unmistakably awake.[16] Sleep EEGs have been seen in waking patients with a variety of nervous or mental ailments. Thus the EEG should be used in conjunction with, and not in preference to, behavioral signs of sleep.

Certain changes in the circulation during sleep have been well documented. For example, the heart rate is decidedly slower during sleep, more so during the night than during daytime naps. In general the heart rate fluctuated considerably during sleep, being altered by loud noises, movements of the sleeper and unknown influences. In general, maximal heart rates were observed most frequently during the first two hours of sleep and the minimal during the seventh.[17]

The blood pressure has been found to drop during sleep, and the drop is proportional to the height of the waking blood pressure. The diastolic pressures do not decrease as much as the systolic, resulting in diminished pulse pressures. The fall in blood pressure in infants and children during sleep is smaller than in adults, commensurate with lower waking pressure.[18]

The effects of sleep on the rate and depth of respiration is controversial and has provoked much disagreement. However, all observers noted a decrease in the ventilation of the lungs during sleep as well as a de-

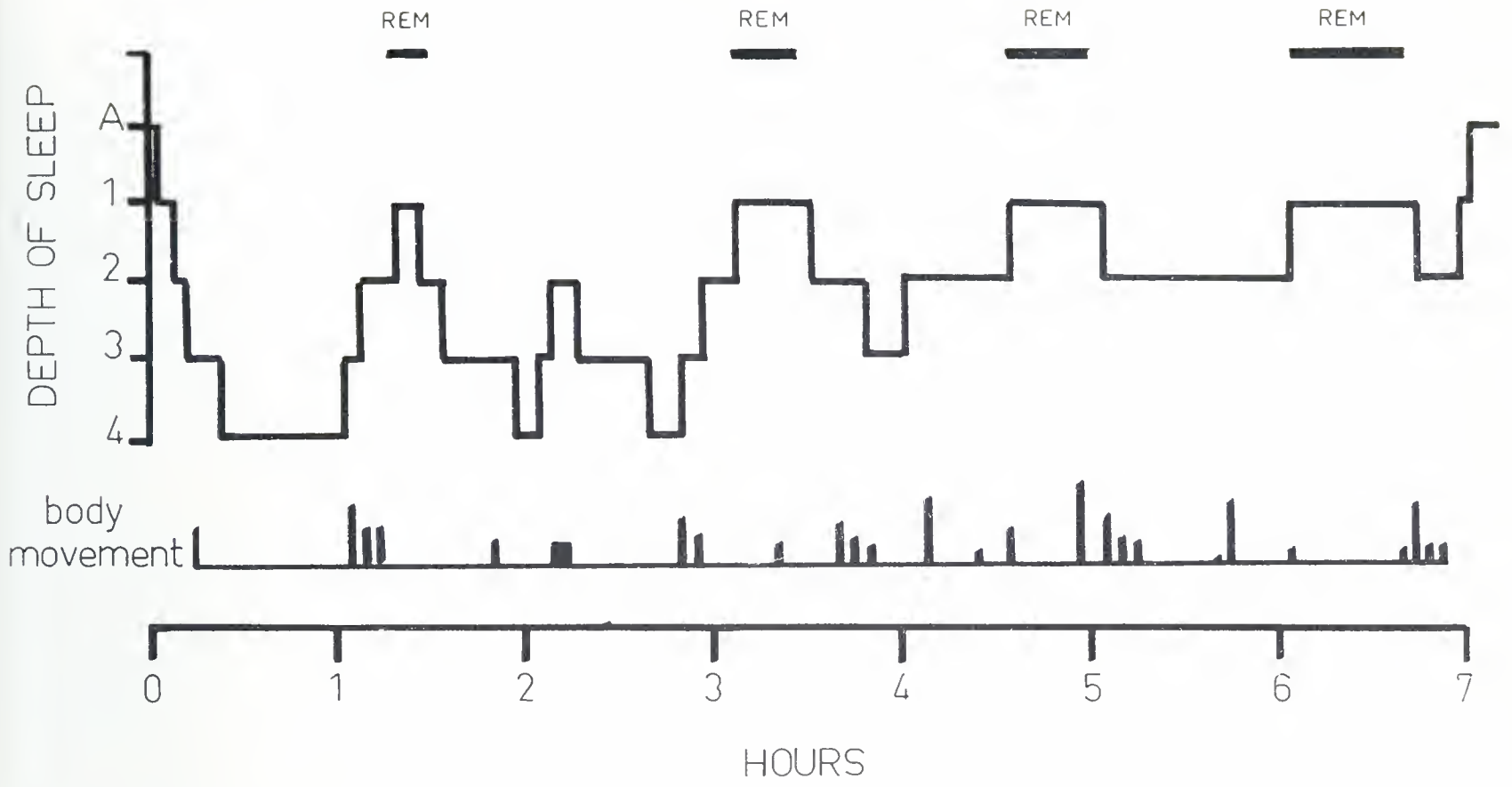

FIG. 1. THE STAGES OF SLEEP.

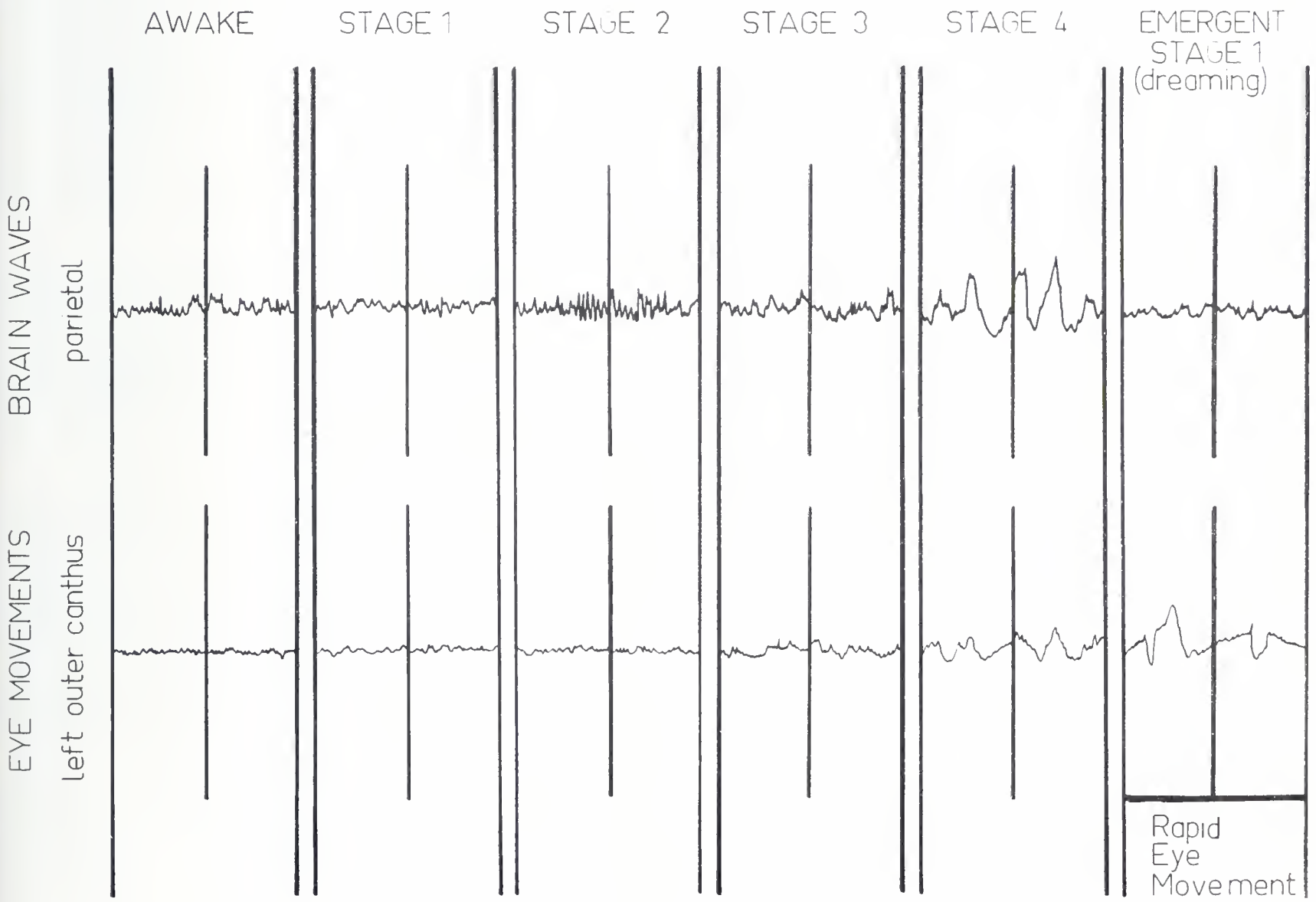

FIG. 2 EEG & EYE MOVEMENT DURING SLEEP.

crease in oxygen consumption. These findings are due to the decreased irritability of the respiratory centre.

Various changes in digestion have been observed in sleep. The secretion of the salivary and other glands of the mouth, nose and throat lessens in sleep, so that, unlike ruminants, we do not keep swallowing. Lacrimal secretion decreases and the eyes feel dry and and gritty.

Hunger contractions in both infants and adults are at least as frequent and strong during sleep as in the waking state. The volume of gastric secretion is decreased at night, but whether the acidity of the gastric juice is increased or decreased is a point of disagreement. The secretion of bile is lower at night.[19] Intestinal movements do not seem to be changed in sleep.

Sleep has a profound effect on urinary excretion. Between midnight and 4 AM, during "deepest sleep", there is a significant fall in glomerular filtration and therefore a diminution of urine formation.[20] A greater amount of acid products, as determined by titration, is excreted during sleep, and the pH of urine is lowered;[13] the excretion of sodium, potassium and chloride is decreased during sleep. The excretion of total nitrogen, urea and amino acids is decreased by 10 - 15% during sleep, but the ammonia excretion is doubled.[21] There is also an increase in phosphate excretion during the night. All the changes in the excretion of urine that have been mentioned can be traced to one or another of the sleep concomitants or external conditions: horizontal posture, relaxation, low temperature, fasting and darkness.

Much has been learned regarding the course of events during the sleep phase, the first being, of course, the onset of sleep. Fatigue and lack of stimulation, or monotony, favour a feeling of drowsiness which ordinarily precedes the onset of sleep. One expression of this feeling is the paroxysmal respiratory movement of yawning. Transient cardiac acceleration and digital vasoconstriction are associated with yawning,[22] which may be an indirect vasomotor adjustment furthering the circulation in the lungs and brain. Conditions of fatigue which lead to yawning in one person ordinarily apply to others who may witness the yawning—hence the imitative aspect of the act.[23]

The behaviour of the eyes is often indicative of drowsiness.[24] The closure of the eyelids is a sure sign of approaching sleep, but with the eyelids still open a peculiar "beady" and dull expression of the eyes is suggestive of sleepiness. While awake and looking over the visual field, a person's eyes normally execute rapid movements in various directions, with "fixation" of the eyes at the end of each movement. With the onset of drowsiness this fixation becomes unsteady, resulting in a wavering of the eye, and long, normally continuous movements might be broken up into short jerks. As sleepiness becomes overpowering, not only do the eye movements become slowed but a pendular rolling type of movement replaces the horizontal.[25]

In one study[26] subjects were instructed to signal whenever they felt that they had just "dropped off". One subject did so 20 times, another 9 times, before actually falling asleep. The authors concluded that "it makes quite meaningless any question as to the exact moment at which a person falls asleep". Further studies have confirmed that the transition from a state of wakefulness to one of sleep is gradual. There is a repeated reversal of sleep and wakefulness prior to the setting in of continuous sleep i.e. the fraction of time occupied by wakefulness gradually decreases as that given over to sleep increases, until at the end of several minutes one has passed from 100% wakefulness to 100% sleep.

Motility during sleep has been a widely studied factor. Kleitman[27] found that a typical sleeper would spend a total of three to five minutes in movement, representing about thirty seconds of motility per hour. The subjects did not "waste" time in moving — they took about 5 to 10 seconds to change from one position to another. More than half of the movements made were found to be minor. Greater motility occurred during the second half of the night as compared to the first.

This proves that no normal person "sleeps like a log". On the contrary, each sleeper has his own repertoire of favourite positions, some mirror images of each other; he eventually, though not in any order, assumes these acceptable positions every night.

The time spent in sleep decreeases with age. The newborn infant sleeps 16.6 hours (mean value). As the child gets older the hours of sleep progressively decrease, until youths between thirteen and twenty-one get 8.75 - 7 hours,[28] approaching the mean value for the general adult population which is given as 8 hours, women sleeping longer than men.

Awakening is a characteristic of sleep distinguishing it from such sleep-like states as coma or anesthesia. Awakening is usually gradual, and several stages are involved in the spontaneous passage from sleep to wakefulness — it is just as hard to say that the sleeping person has awakened at a certain moment as it is to determine the exact time of falling asleep.

In general, toward the end of the night sleep is considerably lighter and movements more frequent than in earlier sleep. There is a gradual increase in the number of afferent impulses: from a distended bladder; from a contracting empty stomach; also probably from the muscles. All these factors tend to produce more frequent lightening of sleep to the point of semi-awakening and, aided by noises and daylight, finally bring the sleeper to the point of actual awakening.

One of the most interesting and significant features of the interval between falling asleep and awakening is the periodic fluctuation in depth of sleep i.e. the periodicity of sleep (Figure 1). Observation of infants revealed a striking regular periodicity of respiration of about 50 minutes duration.[29] Respiration was alternately

retarded and accelerated, and during the accelerated phase there were associated facial, head, limb and body movements, as well as an increased heart rate. Since the discovery of this 50 - 60 minute periodicity in the infant, a 60 - 70 minute one has been observed in the pre-school child and an 85 - 90 minute cycle in the adult. Thus recurring cyclically during adult night sleep are periods of increased body movements, heart rate and respiration rate, with rapid conjugate eye movements and the low voltage EEG picture of light sleep. These recurring periods of light sleep are associated with dreaming.

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Part II: The Objective Investigation of Dreaming

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As early as 1892, a Yale professor of philosophy noted that the eyes wandered during clinical sleep.[1] However, it was not until 1955 when Aserinsky and Kleitman, two prominent researchers in the field of dreaming, observing that in infants eye movements persisted after body movements had ceased, that the further investigation of this earlier observation was undertaken. Kleitman and Aserinsky, by fixing electrodes at the lateral and medial aspects of the eye, recorded the electro-oculogram (EOG), (see Figure 2), which they feel is an index of ocular muscle movement or of corneo-retino potentials. In addition to Bell's phenomenon, they noted two types of ocular movement during sleep.[2] One type was pendular, often asymmetrical, lasting for 3 - 4 seconds, and termed slow eye movements (SEM). The second type were rapid, jerky, symmetrical movements, occurring intermittently for 5 - 60 minutes several times a night. These are called rapid eye movements (REM). *If a subject with REM is awakened, he will report in 90% of such awakenings, that he was dreaming.*

Earlier reference has been made to the EEG and physiological changes indicative of the cyclic deepening and lightening of sleep. When the EEG indicates Emergent Stage 1 (ES1) (see Figure 1), there is the abrupt onset of REM and reported dreaming.[3] This period of REM is unique, for it is accompanied by physiological changes indicative of both lighter and deeper sleep. This has been referred to as the "paradoxical phase" of sleep. Studies on cats and humans with brain stem and cortical lesions, explain these signs of deep and light sleep by

concluding that sleep is controlled by two neurophysiological systems.[4] The first initiates "telencephalic sleep" and essentially is comprised of corticofugal impulses bombarding and suppressing the reticular activating system (RAS), producing deepening sleep. This occurs during Initial Stage 1, Stage 2, 3 and 4 (see Figure 1). The second initiates the "rhombencephalic phase", and originates in spike-like electrical discharges arising in the nucleus reticularis pontis caudalis at the beginning of Emergent Stage 1. This pontine activity produces the signs of lighter sleep during Emergent Stage 1. In rhombencephalic or dream sleep, corticofugal impulses are of lesser importance, but continue to suppress some activities in the ES1 sleeper.

The indicators of deeper sleep which occur at this time are a decrease in general body motility, an increase in galvanic skin resistance, and a ten-fold increase over the waking state in the auditory threshold. The indicators of lighter sleep are a 10% increase in heart rate, a variable increase in respiratory rate, gross body movements, increased wrist and leg muscle potentials, facial movements,[2] vocalization,[5] sleep walking, penile erection,[6,7] masseter muscle contraction[8] and better recall of dreams.

Participation in dream events is thought to account for the changes in wrist and leg muscle potentials,[9] facial movements,[2] vocalization,[2] sleep walking and some gross body movements. It has been suggested that the emotional content of a dream alters the heart and respiratory rates.[10]

We may well ask what is the significance of REM? Kleitman has suggested that they represent the horizontal scanning of the visual dream scene,[11,12] and evidence in support of this visual scanning theory of REM has been offered. Congenitally blind persons have no REM and do not experience visual imagery in dreams.[13] There is a close relationship between the reported visual imagery in the terminal 20 to 30 seconds of dreaming and the recorded sequence of REM.[14] REM occur during daytime fantasy,[15] and hypnotized patients have REM while imagining.[16,17] Finally, there is a high correlation between increased amplitude, velocity, amount of REM and dreamer participation and increased dream eventfulness.[11]

The visual scanning theory of REM has been questioned, however. How can a dreamer, relatively unoriented in space, differentiate horizontal from vertical.[5] Schizophrenic patients, even though reporting many passive dreams of non-moving objects, continue to have the same number of REM as control subjects.[18] The finding that cats deprived of their neocortex have REM seems incompatible with the visual scanning explanation of REM[4] at least in cats!

A neurophysiological model to explain the aetiology of REM has been proposed. Previous reference has been made to electrical activity in the pons during ES1. At present it is felt that spread of the impulse in this region causes conjugate eye movements, alterations in heart and respiratory rate and the masseter action observed during REM. The role of the cortex in dreaming and REM is less certain. The similarity between a prefrontal discharge which occurs just before REM,[19] and lambda occipital EEG waves, thought to denote cortical response to changing visual pattern, suggest that the cortex is responsible for the translation of the physiological changes arising in the pons into dreamed experience. Further support for this is that the REM of the decorticate human are more regular and have fewer characteristics of scanning than those in the intact human. Further work will have to be done in this field in order to determine the significance of many other isolated findings, such as those of Rasmussen and Penfield,[20] who could produce conjugate eye movements after electrically stimulating the frontal and Sylvian cortex, and by stimulation of an area of the temporal lobe, induced dream-like feelings in patients.

By the REM-EEG methods of studying dreams, it has been possible to clarify many suggestions related to the actual duration of dreaming, as well as subjective appreciation of passing dream time. In normal subjects, REM-ES1 dreaming may be found 4 - 5 times per night. The first ES1 is very short; each succeeding one is longer and may last up to 30 minutes (see Figure 1). The total amount of ES1 is about 2 hours, or 20% of sleep time.[2] This amount is higher in infancy, lower in childhood, rises in puberty and gradually declines with old age. Within general limits, all sleepers demonstrate the same basic periodicity and length of REM. More specifically, each individual has a pattern of his own over consecutive nights.[11]

If the duration of an REM episode is recorded, and the subject is then awakened and asked to estimate the duration of his dream, given the choices of 5 or 15 minutes, his estimate of the dream time corresponds with the recorded REM time in over 90% of cases.[21] In dreams into which an auditory stimulus such as a bell has been incorporated, it is found that the time elapsed from the sounding of the bell corresponds closely to the elapsed dream time.[11] If these findings are correct, they tend to refute those who suggest that a dream occurs in a moment before awakening. However, there are many aspects of thought, for instance the fact that some individuals can calculate extraordinary mathematical problems in less than a second, which suggest that concept formation during thinking, and dreaming, may be instantaneous. It may be the translation of the imageless concept into imagery and descriptive recall which takes the time.

Turning now to the recalling of dreams, we find that REM are not infallible indices of dreaming, for it has been found that sensory experience in sleep can occur in their absence.[22] In these cases the EEG of ES1 is thought to be more reliable. Positive reports of dreams

are obtained in about 90% of REM, and in 25% of deep sleep awakenings.[22] One must acknowledge that several investigators have elicited greater than 70% positive dream reports in some non-REM-periods. To decide whether these reports are of dreaming or of memory is problematical.

REM-dream recall seems to be better when associated with a gross body movement, a large increase in heart rate, or when the pulse acceleration is small. The reason for this is thought to be the association with the emotional content of the dream. This recall decreases in amount and accuracy to almost 0 within 10 minutes after the end of REM.[9]

It is well recognized that many people report they never dream. However, the finding that REM and ES1 changes are universal might cause us to doubt this. Indeed, it has been shown that if these non-dreamers are awakened immediately after a period of REM they will report dreaming or thinking. They are in fact non-recallers rather than non-dreamers. However, when awakened during REM, non-recallers do report fewer dreams. The incidence of REM is the same as in recallers, but the EEG pattern of ES1 is interspersed with an occasional alpha wave, an indication of lighter sleep.[22]

The stimuli which cause and alter dreams are not known. The fact that REM as an index of dreaming occur in a rhythmical fashion, as other physiological functions of the body, would indicate that dreams may require no specific stimulus. At least on theoretical grounds, the stimuli to dreaming and dream recall can be external sensory, internal sensory, visceral and psychic.

Dement, using external sensory stimuli of bells, pure tones, light and water, was unable to invoke REM in subjects, although if these stimuli were applied during REM, incorporation of the stimulus into the dream was occasionally observed.[12] In the case of a water spray, 40% of dreams incorporated a rainfall. Such incorporation never occurred if the stimulus was applied during non-REM periods.

Internal sensory stimuli have also been studied. Iatrogenic thirst does not alter the frequency of REM or dream content.[12] Muscle discomfort and body pain appear to be associated with an increased recall of dreams.

Visceral stimuli, in the form of a full bladder, dyspnea and a pregnant uterus are known to increase dream report.

The stimulus arising in the psyche during anxiety increases dream recall, the incidence of nightmares and the recurrence of dream themes.

One example of the effect of a negative stimulus on dreams is in patients with recent and sudden paralysis, who report an increase in dreaming.[23]

While discussing those stimuli which cause and alter dreams, it is appropriate to discuss the sensory modalities which are found in dream imagery. Dream phantasy is mainly visual and auditory. In spontaneously reported dreams, visual elements are 1.5 times more common.[5] In contrast, if patients are questioned about their dreams, visual predominates 10 to 1.[23] It is interesting that dream imagery is visual, whereas classical schizophrenic hallucinations are mainly auditory. Besides the two modalities already mentioned, olfactory and gustatory occur but to a lesser degree. If visual modalities are so common, and if REM are visual dependent, then REM may be an objective way of measuring the amount of visual imagery in a dream.

As mentioned earlier, the congenitally blind have no REM, but do dream. In these patients, auditory replaces visual imagery. Those blind of recent onset show no alteration in the frequency, amount or sensory modality of dreaming.[23]

Deaf patients use sign language for communication in dreams and report visual scenes brilliantly coloured.[24]

Colour in dreams is spontaneously reported more often by women, children, neurotics and by those using colour in their everyday activity, such as painters.[11] However, from careful interrogation, it is possible to elicit reports of colour in nearly 100% of dreams. This probably means that we all dream in colour, but that the intensity of this colour varies from person to person and from time to time.

What is the significance of dreaming?

Experiments by Dement and others indicate that subjects deprived of 75% of their REM dream time become irritable, anxious, hungry, fail to concentrate, experience motor incoordination, have a disturbance of time sense, have hallucinations, and experience a 50 - 80% increase in REM dreaming on recovery nights.[25] Equal deep sleep deprivation has no effect. It has been shown that patients may be dream-deprived by phenobarbital, sodium amytal, amphetamine, imipramine, atropine, alcohol and fever. These patients also demonstrate a compensatory increase in REM dreaming on recovery nights.[26] Caffeine does not alter the total dream time per night, and cholinergic drugs such as Eserine® increase the amount of REM-dreaming.[26] In the light of Dement's studies, *drugs which alter dreaming now have a clinical significance.* Unfortunately, even though Dement's studies suggest that to dream is essential, it is not at all certain whether dreaming is essential for physiological or psychological reasons.

Dement has had the opportunity to study the dream time of "potential schizophrenics".[26] These patients had a total dream time of 5 - 10% greater than normal. During this study one patient had a paranoid psychotic episode, and the total dream time increased to 30% greater than normal. In addition to the increase in total dream time in these subjects, there was a marked dis-

ruption of the cycle of the first dream period, and some irregularity in the EEG with a increase in *alpha* waves. These findings suggest that in addition to an alteration in dream content in psychic upset, there is also an alteration in the amount and pattern of dreaming. In those patients with psychic disturbance, dreaming seems to serve as a safety valve. Further, the tendency for normal dream-deprived subjects to hallucinate implies that in the mentally disturbed, sleep dreaming is not enough, and that it is necessary for dreaming and other forms of imagery to break through into daytime phantasy. Several more recent works indicate that not all patients with psychic upset have an alteration in total dream time.[27]

The demonstrated link, via the limbic midbrain circuit, between the pontine reticular formation and the limbic structures,[4] considered important in the expression of emotion and biological drives, may be the crucial link between the electrical activity in the brain-stem and the emotionally charged experience of dreaming. The limbic system with demonstrated pleasure, punishment, erection and feeding centers, is the part of the brain which one might expect to be linked with the instinctual drives in psychoanalytical theory. While we may eventually fully elucidate the biochemical and neurophysiological basis of the dream mechanism, psychoanalytic theory should prove valuable in organizing and interpreting experimental data, and in providing testable hypotheses for further experiments.

It would seem reasonable to suggest that as the objective investigation of dreams and sleep continues, the full benefit of such research will be obtained if the results are utilized to understand and thereby treat the many clinical upsets of sleep, dreams and their related disorders.

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Part III: The Clinical Phenomenology of Sleep

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Phenomena of clinical interest occur especially during the periods in which one falls asleep and awakens and also during the emergent stage I phases. Moreover, the rhythmicity of sleep may be disturbed and so be a cause of clinical concern.

PHENOMENA OCCURRING IN THE BORDERLINE BETWEEN SLEEP AND WAKEFULNESS

Both falling asleep and awakening are gradual processes marked by fluctuations in the level of conscious-

ness. Thus, at some stage, the sleeper alternates between sleep and wakefulness several times before persisting in either. In these periods, as he flits between sleep and wakefulness, several unusual phenomena beset him. These are not indicative of any pathology but may be a source of consideralbe concern to some anxious patients.

During this period, one may experience *sensory shocks*. These include general bodily sensations as though struck, auditory, visual or olfactory hallucinations, and skin sensations like electric shocks. *Motor jerks* may occur with sensory shocks or occur independently. They consist in sudden inco-ordinate jerks of a whole or part of the body. Thus, both these phenomena are comparable to responses evoked by direct electric stimulation of the sensory or motor cortex. They occur at moments of sudden arousal from stage I sleep to wakefulness.[2]

Hypnagogic and *hypnopompic hallucinations* occur as one falls asleep and awakens respectively. These are discontinuous, though possibly recurrent, organized sensory experiences. One realizes that they are unreal but they seem to force themselves upon him as a passive observer. In contrast to motor jerks and sensory shocks, these occur during brief moments of stage I sleep rather than during the intervening moments of wakefulness. However, as this is stage I sleep, the sleeper may think that he has been awake throughout.[2]

A final phenomenon which may be associated with light sleep is *sleep paralysis*. This can be a terrifying phenomenon in which the individual finds himself unable to make the slightest movement. However, after a few breaths, he finds himself able to move again. The spells are often said to be dissipated by a touch, perhaps after a moan.[2]

Stage I sleep may alternate with wakefulness at other times than when retiring and on awakening. For example, after sleep deprivation for any reason, one tends to undergo brief episodes of such sleep. Thus, night-nurses, when deprived of sleep and undergoing the montony of the quiet ward, may have such episodes. Similarily, *night-nurses' paralysis* may occur as a correlate to sleep paralysis.[2]

PHENOMENA OCCURRING DURING EMERGENT STAGE I OF SLEEP

Sleep-walking occurs in 1-6% of the population. It is commoner in children and also in those with acute or chronic anxiety states and with hysteria.[2] It tends to occur in those who are less emotionally stable with a history of enuresis, nightmares, temper tantrums or phobias.[3]

The sleep-walker performs various acts with a certain degree of dexterity. He can avoid obstacles placed in his path. Nevertheless, his behaviour is characterized by a rigidity and lack of emotionality so that he has the appearance of an automaton. He may answer questions correctly. Being quite receptive to suggestions, he obediently carries out quite bizarre orders. He can carry out dangerous tasks, like walking along the edge of a roof, which he would be afraid to do when awake. However, he may injure himself or others, even without awakening.[4,5] After 15 to 30 minutes of activity, the sleep-walker returns to bed and wakes up the next morning unaware of his night's activities.[1]

The exact level of consciousness in sleep-walking is unknown. Oswald suggests that the sleep-walker is actively participating in a dream world. The cortical activity is of great importance to the dreamer. Accordingly, corticofugal impulses act on the reticular formation so that stimuli from the external world are prevented from reaching consciousness and being recorded in memory.[2]

Night-terrors are also commoner in children, especially if they are emotionally disturbed. They are distinct from nightmares for following a nightmare the child awakens and is oriented. He may be calmed down in a few minutes and may or may not recall the episode the next morning.

In contrast, during a night-terror, the child probably does not awaken completely. However, he sits up in bed and may jump out of bed or run about in an agitated manner. He appears terrified and his eyes are wide open. He is disoriented and may hallucinate, as he cries, shouts, or talks more or less incoherently. The terror may last for 15 to 30 mintues and it cannot be shortened by reassurance. However, it does terminate spontaneously with the child going back to sleep. The following day, the child, like the sleep-walker, will have no memory for the episode.[6]

Nocturnal enuresis commonly occurs during deep sleep in very small infants and children.[1] However, especially in young adults, the patient is in either stage I or stage II of sleep. Some report dreams of orthodox micturition if awakened following enuresis. Moreover, the voiding is of the voluntary type with the use of voluntary muscles. Accordingly, some authors claim that enuresis represents active participation in a dream world.[2] However, others have noted that rapid eye movements tend to be absent and claim that enuresis is a substitute for dreaming.[3]

DISTURBANCES OF THE SLEEP CYCLE

In addition to the various disturbances occurring at different stages of the normal sleep cycle, the cycle itself may be disturbed. Essentially, there may be too little sleep (insomnia), too much sleep (hypersomnia), or sleep at times of normal wakefulness (narcolepsy).

Insomnia

Insomnia consists in sleep that is either too short or too light for the individual. While this is probably the

most common disturbance of sleep, diagnosis may be difficult. There is great variaition in both the needs and desires for sleep. Moreover, those who have been in Stage 1 of sleep may claim to have been awake throughout it. Thus, the amounts of sleep both that are needed and that are enjoyed can be difficult to estimate.[1]

Insomnia usually has no serious irreversible effects in itself and, probably, is best considered as a symptom whose chief importance rests in its underlying cause.[1]

Insomnia is a highly non-specific symptom. One can divide the causes into exogenous and endogenous. Exogenous causes include those connected with occupation. environment and mode of living. Endogenous causes include any disturbance of bodily function that will produce pain or discomfort, and most disturbances in metabolism. Nevertheless, many types of insomnia are associated with no lesions that are demonstrable by current techniques. Some of these are associated with some well-recognized psychiatric syndromes.[1]

The most common type of insomnia is the delayed onset of sleep which is often accompanied by motor unrest ("tossing and turning".) Such patients usually awaken the following morning feeling fatigued and then may experience various neurotic symptoms throughout the day.[1 7]

This type of insomnia is usually associated with anxiety and occasionally with the early stage of an acute schizophrenia. It is probably due to excitatory corticofugal bombardment of the rostral part of the reticular formation.[2] Thus, impulses from the cortex would act on the reticular formation to produce a state of vigilance. Moreover, by all his movements, the patient adds the effect of excitatory proprioceptive impulses on the reticular formation further preventing sleep.[8] Thus, our neurophysiological model rather easily explains this type of insomnia.

Much more difficult to understand is the insomnia manifest by frequent and early wakening from a sleep that is already present. Endogenous depressions are classically associated with such a morning-wakefulness which is often accompanied by a diurnal variation in mood so that the patients feel their worst in the morning.[9]

Recent well-constructed studies have tended to confirm these clinical impressions. Depressive patients do tend to awaken earlier in the morning and more frequently throughout the night. Moreover, they tend to spend a greater proportion of their time asleep in the lighter stages of sleep, and to underestimate the time spent asleep.[8 10 11] However, there is a distinct group of depressive patients who have difficulty in falling to sleep. Experimental studies have not yet been able to confirm the clinical impression that this group represents those with reactive depressions while those who awaken early represent those with endogenous depressions.[10] Thus, scientific investigation has not yet either confirmed nor explained the clinical impressions of this type of sleep disturbance.

Manic patients experience an extreme form of insomnia.[12] Like other sleep-deprived patients, manics tend to experience brief recurrent episodes of light sleep.[2]

In sleep phobia, the insomniac cannot face the imagined terrors or consequence of sleep. He clings to wakefulness desparately and may even commit suicide to escape the nameless terrors of sleep.[13] This condition is seen in neurotics, and possibly in psychotics. A similar condition is seen in anxious medical patients, particularly cardiacs.

Thus, insomnia is a highly nonspecific symptom but may exhibit patterns suggestive of its underlying cause.

Hypersomnia

Hypersomnia may be defined as uncontrollable sleepiness with pathologically deep and prolonged sleep. From such sleep, it is sometimes difficult to arouse the sleeper. Moreover, it may be difficult to keep him awake for any period of time after he has been awakened. Accordingly, there are all gradations and oscillations between hypersomnia and coma. A condition which starts out as somnolence may terminate in coma.[14]

Consequently, it is not surprising that in those cases in which pathology is demonstrable, the disturbances in hypersomnia and coma tend to be the same. Such disturbances may be either local (in the brain) or systemic metabolic disorders.

Any lesion or functional disturbance of the reticular formation or its pathways to the cortex may produce hypersomnia. Moreover, such disorders may produce other symptoms due to involvement of other functions of these areas (e.g. fever, polycythemia, menstrual disturbances, cranial nerve palsies, etc.)[1] For example, the Kleine-Levin Syndrome consists in periodic hypersomnia with polyphagia.[15 16]

Any lesion associated with increased intracranial pressure may produce somnolence, probably via pressure on the reticular formation.[21]

Most of the various systemic disease which produce somnolence also produce coma. Accordingly, excess sleepiness may be associated with hypothyroidism, diabetes mellitus and pituitary, renal and respiratory insufficiency. However, it may also occur with obesity and mental retardation.[1 17 25]

Lesions in the brain stem, instead of producing excess sleep, may interfere with the rhythms of sleep. For example, the overall diurnal variation in sleep may be reversed in encephalitis lethargica, arteriosclerosis and senility. Elderly arteriosclerotics may experience brief moments of sleep throughout the day followed by the inability to sleep at night.[1]

These women are often filled with rage and aggression toward men. They exhibit a number of variable traits. They often champion men who are sick, or have some physical impairment, like an amputation. Other aggressive frigid women chose the passive effeminate type of husband whom they can dominate. These type of women may even show immoderate sexual desire, wearing out the male with no gratification for herself. Or she may contempuously reject the sexual act with inappropriate remarks . . . "have you really finished?" She displays no vestige of tenderness, before, during or after intercourse.

c) Vaginismus

This is the unconscious desire not only to prevent penetration, but also to hold on to the penis. The muscle spasm represents the repressed desire to castrate the male and to reject the sexual role of the female.

d) Frigidity with Masochistic Mechanisms

The female identifies with her mother, and sex is looked upon as a cruel sadistic act. This fear can become secondarily sexualized and enjoyed in the imagination as a masochistic pleasure. The pleasureable element of sexuality remains only the anxiety or the erotization of fear. Intensive repression of masochistic instincts, namely the normal passive, receptive role of the female leads to narcissistic fear of defloration.

e) Frigidity with Ascetic, Anti-sexual Ideology

This type of frigidity is bound up with the struggle to compete on an equal basis with men in modern day society. Frigidity gives the female an added advantage. To obtain orgasm is to be conquered. Or in yet another instance, the women may love her husband dearly, and maintains the pose of being interested only in spiritual love. She withholds sexual favors from her 'beloved' husband, because sex is unclean, and this would contaminate the relationship. However, she may indulge in illicit affairs, and prostitute herself to a man whom she knows only casually. Her orgastic response will be intense and satisfying. In this case, the adventure of doing something dirty and immoral triggers the orgasm.

The above etiological classification ends the discussion on sexual frigidity. Prophylaxis and treatment will not be discussed at this time, since for the most part these topics are applicable to specific, individual cases, and general discussion would not prove productive.

Let us end up on a less psycho-pathological note. In Maslow's article "Love in Self Actualizing People" he discusses the healthy, attitude toward sex activity. "Sex very frequently becomes a kind of game, in which laughter is quite as common as panting. It is not the welfare of the species or the task of reproduction or the future development of mankind that attracts people to each other. The sex life of healthy people, in spite of the fact that it frequently reaches great peaks of ecstasy, is nevertheless compared to the games of children and puppies. It is cheerful, humerous and playful!"

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   - **D. Functional Disturbances in the Sexual Life of Women; Frigidity and Related Disorders.**
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Abstract

Histoplasmosis

McCulloch, C.: Tr. Can. Ophth. Soc. 26: 107-125, 1963.

Certain types of granulomatous chorioretinitis appear to be caused by Histoplasma capsulatum even though the fungus has not been demonstrated culturally or pathologically in the eye. Nine clinical cases are described with evidence of systemic infection and showing the characteristic ocular signs. They show typical retinal lesions, paramacular lesions and those around the optic disc. The natural history of these ocular changes is described.

Reasons for accepting Histoplasmosis as the cause of these lesions are discussed and specific treatment with amphotericin B is advocated with avoidance of steroids in order to save sight, even in the absence of proof of the etiological agent.

M.T.

E. M. Sellers 6T5

Answers on page 220

1. This 46 year old, very short para o gravida o female has had primary amenorrhea all her life. At least three characteristic features which would explain her sterility and amenorrhea are demonstrated in Figure 1. What is the diagnosis and what other clinical features are there of this condition?

2. Upon admission this man's liver was noted to be firm, nontender, and 3 fingers below the right costal margin. What clinical sign does Figure 2 illustrate? What explanation has been advanced to account for the occurrence of this lesion?

3. What bony lesions are associated with the *café au lait* pigmentation on this young girl's leg? What other clinical features are these of this syndrome? With what conditions could this patient's disease be confused?

The Sources of Our Love

G. S. Duckworth 6T5

"The man who does not know history is condemned to relive it" Santayana.

Love is a word to conjure with. Brave men have died for it, nations have warred for it, poets have praised it and saints have prayed for it. We have all been brought up to believe that imaginative literature and the fine arts must both of necessity be preoccupied with the subject of love. It is only when we turn to the works of an earlier age—Homer, Vergil, Boewulf, Roland — that we realize how unnatural such an obsession with love must have seemed to them. Likewise we assume that love is ennobling and, at the very least, the sole basis for marriage. We are shocked to learn how foreign is this idea to ancient thought. This essay is an attempt to trace the stages in men's attitudes to love in tho hope that some historical perspective will help to free us from excessive bondage to our own culture.

Death menaced early man at every turn. His problems were those of life and death, and all his activities centred around the effort to preserve himself and derivatively his tribe, in the face of a hostile universe. In this struggle woman performed certain necessary functions for which she was valued, not least of which was that of bearing children to assure the future of the tribe. Because she was assessed functionally, woman could be bought and sold for anything of equivalent survival value. But although woman was a piece of portable property, prolongued association could foster a relation of affection between herself and her owner. So Isaac was always fond of Rebekah, even though he had paid hard cash for her. Thus marriage in this early period was a purely social relationship conditioned by the needs for life and health and arranged by parents without the knowledge or consent of the partners involved. The man-woman relationship was primarily a utilitarian association with sex as a socially necessary activity.

The Greeks, originally similar in their attitude to the early Hebrews, soon began to feel themselves marked off from the surrounding welter of alien tribes by their "greater enlightenment, and emanicipation from silly nonsense." In short, by their emerging rationality. But the intellect soon became aware of an annoying distraction and a source of many false ideas and opinions—the flesh. This realization was sharpened by the impact of Eastern religions upon the Greek consciousness.

Buddha, mindful of the impermanence of the flesh and the sufferings and disorders which it occasioned, early decided that "successful high-mindedness seems to me incompatible with . . . attachment to sensory concerns . . . you will not prevail upon me to devote myself to ignoble sense pleasures." When a king asked his disciples whether they valued the body, they replied "Just as you, being wounded in battle, care for and attend to the wound, so we care for the body without being attached to it." The whole world of the senses came to be an illusion which the wise man forsook in his search for truth.

Influenced by Eastern thought, Orphic religion taught that the body was a prison or tomb for the soul. The Orphic stream flowed through the Pythagoreans to taint all Greek rationalism with a contempt for the flesh and its workings. Meanwhile woman, rendered partially useless by the emergence of slave classes trained in the household tasks which were formerly hers, lost even more status by her sheltered up-bringing which kept her uneducated and completely ignorant of events in society. It is not surprising that intelligent men, unwilling to squander their wit and education on illiterate females, shunned their society in favour of their social and intellectual equals—other men, or rarely a hetaera (a type of prostitute trained to be sexually and intellectually stimulating). So unpopular was marriage in sixth century B.C. Greece, that Solon considered passing a law making it compulsory.

The Greek male had a lively contempt of woman; and a thriving antifeminist literature sprang up berating woman for her numerous faults. "Marriage brings a man only two happy days", wrote Pallades, "the day he takes his bride to bed and the day he lays her in her grave." With this sort of background sex, as one could expect, was either looked on as a wilful wallowing in the muck or as an unhappy madness: "I was mad, a god touched me with madness" cried Euripides' Phaedra. Sophocles, on being asked whether he missed the sensual delight of his youth, retorted "Don't talk to me about that! It's like being freed from bondage to a raging madman."

Not being inhuman however, the Greeks had to have some emotional relationship with others. This relation took two forms: the first was an intellectually satisfying friendship with one's equals. The other was that curious affair, the homosexual cult of boy-love. The Greek seems to have responded to an adolescent boy much as modern man does to a young, intelligent and well-educated girl. Although it is clear that women, being illiterate, could not evoke either friendship or romance, the question remains—and is still unanswered—why the Greeks should have created this particular kind of relationship, as emotionally stirring as it was peculiar But fundamentally their attitude was to eschew fleshly

entanglements and pursue honour and wisdom. Love was not to be honoured, but to be ignored.

PLATO

What, however, did the greatest of Greek thinkers, Plato, say about love? It is difficult to understand the thoughts of this complex genius, accustomed to looking at life from diverse viewpoints. In the *Symposium,* we have a series of after-dinner speeches by various people, heaping praise upon the god of love. Finally it is Socrates' turn. Love, says Socrates, always has an object which it desires. Since one desires what one does not possess, love, desiring the beautiful and the good, cannot be either. This does not mean that it is ugly or bad but rather that it is between the two states. "Carrier and interpreter between men and gods, it brings human prayers and sacrifices to the latter, commandments and rewards to the former. Existing in the place between the two, it completes and binds the whole together by means of itself."

The gods and the wise do not love wisdom, for they possess it. Nor do the ignorant, for not knowing it exists, they believe themselves beautiful, wise and good. Being between these, Eros loves beauty and wisdom and strives to create it. Yet the creations of beauty differ greatly. The man of the flesh loves the body and creates children, but the man of the soul loves beauty and wisdom and creates ideas, laws and poems, offspring more beautiful and more immortal.

"A man who approaches this matter in the right way must begin in youth by frequenting beautiful bodies and, if he is guided aright, he will first love one such body and hence produce beautiful thoughts. Then he will perceive that the beauty of one body is akin to that of another, and if he must pursue physical beauty it is very absurd not to consider all physical beauty to be one and the same. Realizing this he will be the lover of all beautiful bodies and he will relax his passion for a particular one and despise it as something small. Next he will consider beauty of soul to be more worthy than beauty of body so that if any one with a fair soul have but small physical grace, it will suffice; he will love and cherish such a one and seek to utter such thoughts as make young men better; that he may further be forced to contemplate the beauty of laws and traditions and see that this is all of one kin. He will then consider beauty of body a small thing. From traditions he will be guided to the sciences, that he may see the beauty of these, gazing upon much beauty and no longer on that of one thing like a slave who loves the beauty of his boy or of some one man or one institution, an inferior feature of little worth. Not so, but turning to the vast sea of beauty and gazing upon it he will utter thoughts both proud and beautiful in the abundance of his love of wisdom until he gathers strength there and power to look upon one such science, which is the knowledge of beauty such as this. The man who has been guided thus far in the mysteries of love, and who has directed his thoughts towards examples of beauty in due and orderly succession, will suddenly have revealed to him as he approaches the end of his initiation a beauty whose nature is marvellous indeed, the final goal of all his previous efforts. This beauty is first of all eternal; it neither comes into being nor passes away, neither waxes nor wanes; he will see it as absolute, existing alone with itself, unique, eternal, and all other beautful things as partaking of it, yet in such a manner that, while they come into being and pass away, it neither undergoes any increase or diminution nor suffers any change."

So in the final vision of beauty itself, the lover loses himself and the love of all particular beauties. The love of another person is the rung of a ladder which must be left behind if we are to arrive at the pure love of Ideas.

Yet in the *Phaedrus,* we get a different impression of human love. Here Socrates castigates the physical and possessive lovers who "act under compulsion . . . chained by passion as by a disease . . ." but then goes on to tell how the soul, shaped and winged in eternity, homelessly walks the earth until suddenly its eyes are infected with the beauty of another person and rooted to the gaze, trembling with unknown feelings, the soul strains at its bonds and sprouts new wings. The beloved, astonished at the divinity of this love surpassing all others he has known, feels his own soul quicken and stir until both in harmony fly to the limits of the known and gaze enamoured at the uncreated Ideas from which they sprang. This passage, taken together with Plato's casual suggestion (*Laws*) that by forbidding homosexuality and practising moderation in conjugal sex "men will be friends to their wives," seems to be the birth-cry of romantic love.

But the bonds of society were too strong for Plato. Knowing that the revolutionary suggestion that women could be friends on an equal footing with men would be branded as "unrealistic" and thrown out of court, he provides a "second-best law" whereby all intercourse is branded as shameful in the interests of men's higher selves. This, he knew, had far more chance of being accepted than a quixotic ideal based on some mythical idea of the equality of women. We see then, that in Plato also we find the Greek tendency to stigmatize sex as being excessively "physical" and to fly by the intellect from the love of the particular to that of the general, from mortal man to the boundless ocean of reality, in which the questing soul finally loses itself.

Yet Plato's description of love is unique. For the first time we see the sources of love—the immortal longings of man's higher soul, the eternal truths towards which Eros impels man. We see the unhappy mind rising on the wings of love to contemplate the true nature of things, passing through the baser to the purer loves until it finally catches a vision of the uncreated ideas and rests forever in the knowledge of things as they essentially *are*. So Eros is the road the thinker must tread in order to reach true knowledge. The man who

first things first

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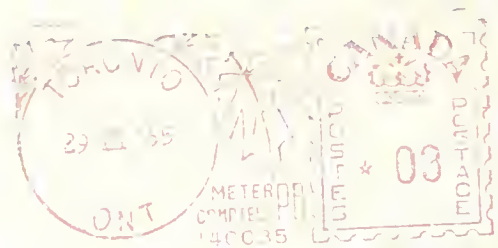

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